JVC

SERVICE MANUAL

COLOUR TELEVISION

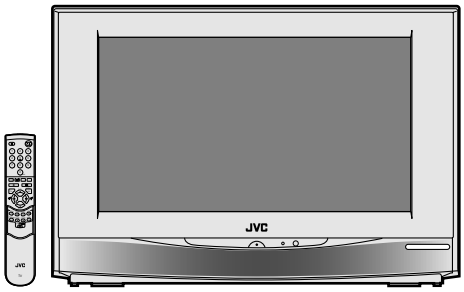
AV-28H4BU, AV-28H4SU, AV-28H40SU, AV-28H77SK, AV-32H4BU, AV-32H4SU, AV-32H40SU, AV-32H47SU, AV-32H77SK

BASIC CHASSIS
ML2

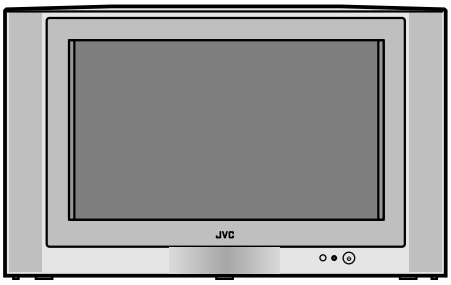
InteriArt

Natural Vision

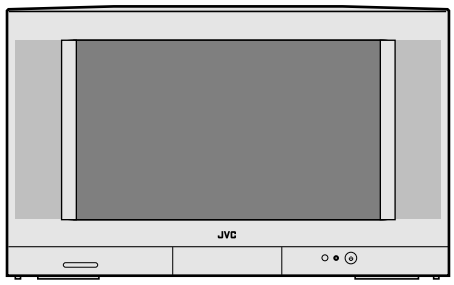
T-V LINK



AV-28H4SU, AV-28H4BU
AV-32H4SU, AV-32H4BU



AV-28H40SU, AV-28H77SK
AV-32H40SU, AV-32H77SK



AV-32H47SU

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No.YA063
2004/3

SPECIFICATION

Item		Content		
		AV-28H4BU AV-28H4SU	AV-28H40SU	AV-28H77SK
Dimensions (W × H × D)		76.2cm × 52.8cm × 49.3cm	85.4cm × 50.8cm × 49.0cm	
Mass		39.0kg		
TV RF System		CCIR (B/G, D/K, I, L)		CCIR (I)
Colour System		PAL SECAM NTSC 3.58 / NTSC 4.43 (Only in EXT mode)		PAL NTSC 3.58 / NTSC 4.43 (Only in EXT mode)
Stereo System		A2 (B/G, D/K) NICAM (B/G, I, D/K, L)		NICAM (I)
Teletext System		FLOF (Fastext) TOP (German system) WST (World standard system)		FLOF (Fastext) WST(World standard system)
Receiving Frequency	VHF	47MHz ~ 470MHz		---
	UHF	470MHz ~ 862MHz		
	French CATV	116MHz ~ 172MHz 220MHz ~ 469MHz		---
Intermediate Frequency	VIF	38.9MHz (B/G, D/K, I, L)		38.9MHz (I)
	SIF	33.4MHz (5.5MHz:B/G) 32.9MHz (6.0MHz:I) 32.4MHz (6.5MHz:L, D/K)		32.9MHz (6.0MHz:I)
Colour Sub Carrier Frequency	PAL	4.43MHz		
	SECAM	4.40625MHz / 4.25MHz		---
	NTSC	3.58MHz / 4.43MHz		
Power Input		AC220V ~ AC240V, 50Hz		
Power Consumption		120W, standby : 2.5W		
Aerial Input Terminal		75Ω unbalanced, coaxial		
Picture Tube		Visible size : 66cm, Measured diagonally H : 58.3cm × V : 33.0cm		
High Voltage		31.0kV (+1kV / -1.5kV) (at zero beam current)		
Speaker		13cm × 6.5cm oval type × 2		
Audio Power Output		10W + 10W		
EXT-1 / EXT-2 / EXT-3 (Input / Output)		21-pin Euro connector, SCART socket × 3		
EXT-4 (Input)	S-Video	Mini-DIN 4 pin × 1 Y : 1V(p-p) positive (negative sync, 75Ω) C : 0.3V(p-p) (Burst signal, 75Ω)		
	Video	1V(p-p) 75ohm, RCA pin jack × 1		
	Audio (L/R)	500mV(rms) (-4dBs), High impedance, RCA pin jack × 2		
AUDIO OUT (Variable)		0~1000mV(rms), Low impedance, RCA pin jack × 2		
Headphone Jack		3.5mm Stereo mini jack × 1		
Remote Control Unit		RM-C64H (AAA/R03 dry battery × 2)		

Design & specifications are subject to change without notice.

Item		Content			
		AV-32H4BU AV-32H4SU	**AV-32H40SU**	**AV-32H47SU**	**AV-32H77SK**
Dimensions (W × H × D)		86.4cm × 58.7cm × 55.0cm	94.6cm × 56.1cm × 54.7cm	94.8cm × 56.2cm × 55.0cm	94.6cm × 56.1cm × 54.7cm
Mass		53.0kg		52.5kg	53.0kg
TV RF System		CCIR (B/G, D/K, I, L)			CCIR (I)
Colour System		PAL SECAM NTSC 3.58 / NTSC 4.43 (Only in EXT mode)			PAL NTSC 3.58 / NTSC 4.43 (Only in EXT mode)
Stereo System		A2 (B/G, D/K) NICAM (B/G, I, D/K, L)			NICAM (I)
Teletext System		FLOF (Fastext) TOP (German system) WST(World standard system)			FLOF (Fastext) WST (World standard system)
Receiving Frequency	VHF	47MHz ~ 470MHz			---
	UHF	470MHz ~ 862MHz			
	French CATV	116MHz ~ 172MHz 220MHz ~ 469MHz			---
Intermediate Frequency	VIF	38.9MHz (B/G, D/K, I, L)			38.9MHz (I)
	SIF	33.4MHz (5.5MHz:B/G) 32.9MHz (6.0MHz:I) 32.4MHz (6.5MHz:L, D/K)			32.9MHz (6.0MHz:I)
Colour Sub Carrier Frequency	PAL	4.43MHz			
	SECAM	4.40625MHz / 4.25MHz			---
	NTSC	3.58MHz / 4.43MHz			
Power Input		AC220V ~ AC240V, 50Hz			
Power Consumption		130W, standby : 2.5W			
Aerial Input Terminal		75Ω unbalanced, coaxial			
Picture Tube		Visible size : 76cm, Measured diagonally H : 67.4cm × V : 38.4cm			
High Voltage		31.0kV (+1kV / -1.5kV) (at zero beam current)			
Speaker		13cm × 6.5cm oval type × 2			
Audio Power Output		10W + 10W			
EXT-1 / EXT-2 / EXT-3 (Input / Output)		21-pin Euro connector, SCART socket × 3			
EXT-4 (Input)	S-Video	Mini-DIN 4 pin × 1 Y : 1V(p-p) positive (negative sync, 75Ω) C : 0.3V(p-p) (Burst signal, 75Ω)			
	Video	1V(p-p) 75ohm, RCA pin jack × 1			
	Audio (L/R)	500mV(rms) (-4dBs), High impedance, RCA pin jack × 2			
AUDIO OUT (Variable)		0~1000mV(rms), Low impedance, RCA pin jack × 2			
Headphone Jack		3.5mm Stereo mini jack × 1			
Remote Control Unit		RM-C64H (AAA/R03 dry battery × 2)			

Design & specifications are subject to change without notice.

SECTION 1
PRECAUTION

1.1 SAFETY PRECAUTIONS [EXCEPT FOR UK]

(1) The design of this product contains special hardware, many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the products should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the products have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. **Electrical components having such features are identified by shading on the schematics and by (⚠) on the parts list in Service manual**. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list of Service manual may cause shock, fire, or other hazards.

(4) **Don't short between the LIVE side ground and ISOLATED (NEUTRAL) side ground or EARTH side ground when repairing.**
Some model's power circuit is partly different in the GND. The difference of the GND is shown by the LIVE : (⊥) side GND, the ISOLATED (NEUTRAL) : (⏚) side GND and EARTH : (⏚) side GND.
Don't short between the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND and never measure the LIVE side GND and ISOLATED (NEUTRAL) side GND or EARTH side GND at the same time with a measuring apparatus (oscilloscope etc.). If above note will not be kept, a fuse or any parts will be broken.

(5) If any repair has been made to the chassis, it is recommended that the B1 setting should be checked or adjusted (See B1 POWER SUPPLY check).

(6) The high voltage applied to the picture tube must conform with that specified in Service manual. Excessive high voltage can cause an increase in X-Ray emission, arcing and possible component damage, therefore operation under excessive high voltage conditions should be kept to a minimum, or should be prevented. If severe arcing occurs, remove the AC power immediately and determine the cause by visual inspection (incorrect installation, cracked or melted high voltage harness, poor soldering, etc.). To maintain the proper minimum level of soft X-Ray emission, components in the high voltage circuitry including the picture tube must be the exact replacements or alternatives approved by the manufacturer of the complete product.

(7) Do not check high voltage by drawing an arc. Use a high voltage meter or a high voltage probe with a VTVM. Discharge the picture tube before attempting meter connection, by connecting a clip lead to the ground frame and connecting the other end of the lead through a 10kΩ 2W resistor to the anode button.

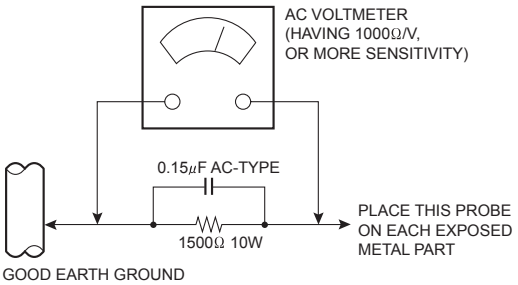
(8) When service is required, observe the original lead dress. Extra precaution should be given to assure correct lead dress in the high voltage circuit area. Where a short circuit has occurred, those components that indicate evidence of overheating should be replaced. Always use the manufacturer's replacement components.

(9) **Isolation Check (Safety for Electrical Shock Hazard)**
After re-assembling the product, always perform an isolation check on the exposed metal parts of the cabinet (antenna terminals, video/audio input and output terminals, Control knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

a) **Dielectric Strength Test**
The isolation between the AC primary circuit and all metal parts exposed to the user, particularly any exposed metal part having a return path to the chassis should withstand a voltage of 3000V AC (r.m.s.) for a period of one second. (. . . Withstand a voltage of 1100V AC (r.m.s.) to an appliance rated up to 120V, and 3000V AC (r.m.s.) to an appliance rated 200V or more, for a period of one second.)
This method of test requires a test equipment not generally found in the service trade.

b) **Leakage Current Check**
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.2mA AC (r.m.s.).

Alternate Check Method
Plug the AC line cord directly into the AC outlet (do not use a line isolation transformer during this check.). Use an AC voltmeter having 1000Ω per volt or more sensitivity in the following manner. Connect a 1500Ω 10W resistor paralleled by a 0.15μF AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter. Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75V AC (r.m.s.). This corresponds to 0.5mA AC (r.m.s.).
However, in tropical area, this must not exceed 0.3V AC (r.m.s.). This corresponds to 0.2mA AC (r.m.s.).



1.2 SAFETY PRECAUTIONS [FOR UK]

(1) The design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.

(2) Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.

(3) Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessary be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the Parts List of Service Manual may cause shock, fire, or other hazards.

(4) The leads in the products are routed and dressed with ties, clamps, tubing's, barriers and the like to be separated from live parts, high temperature parts, moving parts and / or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.

WARNING

(1) The equipment has been designed and manufactured to meet international safety standards.
(2) It is the legal responsibility of the repairer to ensure that these safety standards are maintained.
(3) Repairs must be made in accordance with the relevant safety standards.
(4) It is essential that safety critical components are replaced by approved parts.
(5) If mains voltage selector is provided, check setting for local voltage.

SECTION 2
SPECIFIC SERVICE INSTRUCTIONS

2.1 FEATURES

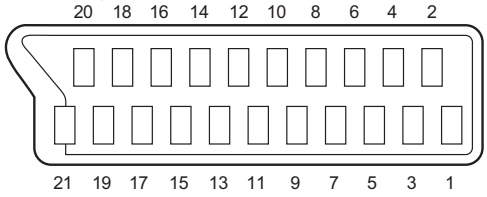
- New chassis design enable use of an interactive on screen control.
- The TELETEXT SYSTEM has a built-in FASTEXT (UK system), TOP (German system) and WST (world standard system) system.
- Because this TV unit corresponds to multiplex broadcast, users can enjoy music programs and sporting events with live realism. In addition, BILINGUAL programs can be heard in their original language.
- Users can make VCR dubbing of picture and sound by controlling the AV selector to select an optional source at the EXT-2 output shown in figure.

2.2 21-pin Euro connector (SCART) : EXT-1/EXT-2/EXT-3

Pin No.	Signal designation	Matching value	EXT-1	EXT-2	EXT-3
1	AUDIO R output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)	Not used
2	AUDIO R input	500mV(rms) (Nominal), High impedance	Used (R1)	Used (R2)	Used (R3)
3	AUDIO L output	500mV(rms) (Nominal), Low impedance	Used (TV OUT)	Used (LINE OUT)	Not used
4	AUDIO GND		Used	Used	Used
5	GND (B)		Used	Used	Used
6	AUDIO L input	500mV(rms) (Nominal), High impedance	Used (L1)	Used (L2)	Used (L3)
7	B input	$700mV_{(B-W)}$, 75Ω	Used	Used	Not used
8	FUNCTION SW (SLOW SW)	Low : 0V-3V High : 8V-12V, High impedance	Used	Used	Used
9	GND (G)		Used	Used	Used
10	SCL / T-V LINK		Not used	Used (SCL2 / TV-LINK)	Not used
11	G input	$700mV_{(B-W)}$, 75Ω	Used	Used	Not used
12	SDA		Not used	Used (SDA2)	Not used
13	GND (R)		Used	Used	Used
14	GND (YS)		Used	Not used	Not used
15	R / C input	R : $700mV_{(B-W)}$, 75Ω C : $300mV_{(P-P)}$, 75Ω	Used (R)	Used (C2/R)	Used (C3)
16	Ys input (FAST SW)	Low : 0V-0.4V, High : 1V-3V, 75Ω	Used	Used	Not used
17	GND (VIDEO output)		Used	Used	Used
18	GND (VIDEO input)		Used	Used	Used
19	VIDEO output	$1V_{(P-P)}$ (Negative sync), 75Ω	Used (TV OUT)	Used (LINE OUT)	Not used
20	VIDEO / Y input	$1V_{(P-P)}$ (Negative sync), 75Ω	Used	Used	Used
21	COMMON GND		Used	Used	Used

(P-P= Peak to Peak, B-W= Blanking to white peak)

[Pin assignment]



2.3 MAIN DIFFERENCE LIST

Item	AV-28H4BU	AV-28H4SU	AV-28H40SU	AV-28H77SK
Dimensions (W × H × D)	76.2cm × 52.8cm × 49.3cm	←	85.4cm × 50.8cm × 49.0cm	←
Mass	39.0kg	←	←	←
Cabinet colour	Black	Silver	←	←
Power cord	EU type(2-pin)	←	←	UK type(3-pin)
Colour system	PAL, SECAM	←	←	PAL
RF system	CCIR (B/G, D/K, I, L)	←	←	CCIR (I)

Item	AV-32H4BU	AV-32H4SU	AV-32H40SU	AV-32H47SU	AV-32H77SK
Dimensions (W × H × D)	86.4cm × 58.7cm × 55.0cm	←	94.6cm × 56.1cm × 54.7cm	94.8cm × 56.2cm × 55.0cm	94.6cm × 56.1cm × 54.7cm
Mass	53.0kg	←	←	52.5kg	53.0kg
Cabinet colour	Black	Silver	←	←	←
Power cord	EU type(2-pin)	←	←	←	UK type(3-pin)
Colour system	PAL, SECAM	←	←	←	PAL
RF system	CCIR (B/G, D/K, I, L)	←	←	←	CCIR (I)

2.4 TECHNINAL INFORMATION

2.4.1 MAIN MI-COM (CPU) PIN FUNCTION

Pin No.	Pin name	I/O	Function	Pin No.	Pin name	I/O	Function
1	TCK	I	Not used	65	D2	I/O	Data bit for PP-RAM/SD-RAM
2	TMS	I	Not used	66	D12	I/O	Data bit for PP-RAM/SD-RAM
3	TDI	I	Not used	67	D10	I/O	Data bit for PP-RAM/SD-RAM
4	TDO	O	Not used	68	VSS33	--	GND
5	P2.8	I	Remote control	69	VDD33	i	3.3V
6	P2.9	I	Key scan for front control CH+(On: L)	70	D4	I/O	Data bit for PP-RAM/SD-RAM
7	P2.10	I	Key scan for front control CH- (On: L)	71	D3	I/O	Data bit for PP-RAM/SD-RAM
8	P2.11	I	Key scan for front control MENU (On: L)	72	D11	I/O	Data bit for PP-RAM/SD-RAM
9	P2.12	I	Receive data for TV_LINK	73	RSTIN	I	Reset for main CPU
10	P2.13	O	Power on /off control (ON: L)	74	P3.0	I/O	Data for inter IC control bus
11	P2.14	I	X-ray HB LB EW correction Protection detection (Normal: H)	75	P3.1	I/O	Data for inter IC control bus
12	P2.15	I	Main power detection (Normal: H)	76	P3.2	I	Remote control
13	VSS33	--	GND	77	P3.3	O	Power indication control (On: L)
14	VDD33	i	3.3V	78	P3.4	O	Audio muting (Muting: H)
15	P4.5/CS3	O	Output data for TV_LINK	79	P3.5	O	Audio muting (Muting: H)
16	P4.4/A20	O	Address bit for PP-RAM/SD-RAM	80	P3.6	O	Not used
17	P4.3/A19	O	Address bit for PP-RAM/SD-RAM	81	P3.7	O	Not used
18	P4.2/A18	O	Address bit for PP-RAM/SD-RAM	82	P3.8	I/O	Not used
19	P4.1/A17	O	Address bit for PP-RAM/SD-RAM	83	P3.9	I/O	Not used
20	VSS25	--	GND	84	VSS33	--	GND
21	VDD25	I	2.5V	85	VDD33	I	3.3V
22	P4.0/A16	O	Address bit for PP-RAM/SD-RAM	86	VSS25	--	GND
23	A8	O	Address bit for PP-RAM/SD-RAM	87	VDD25	I	2.5V
24	A7	O	Address bit for PP-RAM/SD-RAM	88	TXD0	I/O	Not used
25	A9	O	Address bit for PP-RAM/SD-RAM	89	RXD0	I/O	Not used
26	A6	O	Address bit for PP-RAM/SD-RAM	90	P3.12	O	Not used
27	A5	O	Address bit for PP-RAM/SD-RAM	91	P3.13	O	Not used
28	A10	O	Address bit for PP-RAM/SD-RAM	92	P3.15	O	Not used
29	A11	O	Address bit for PP-RAM/SD-RAM	93	P5.14	I	RGB input of EXT-2 active
30	A12	O	Address bit for PP-RAM/SD-RAM	94	P5.15	I	Headphone connection detection (Connect: H)
31	VSS33	--	GND	95	TRIG_IN	--	Not used
32	VDD33	i	3.3V	96	TRIG_OUT	--	Not used
33	A4	O	Address bit for PP-RAM/SD-RAM	97	P6.2	O	Notifies bus free state (Stop mode: H)
34	A3	O	Address bit for PP-RAM/SD-RAM	98	P6.3	O	Clock for inter IC control bus
35	A2	O	Address bit for PP-RAM/SD-RAM	99	P6.4	I/O	Data for inter IC control bus
36	A1	O	Address bit for PP-RAM/SD-RAM	100	P6.5	O	MSP reset (Reset: H)
37	A0	O	Address bit for PP-RAM/SD-RAM	101	P6.6	--	Not used
38	A13	O	Address bit for PP-RAM/SD-RAM	102	VSYNC	I	Vertical sync
39	A14/RAS	O	Row address strobe for SD-RAM access	103	HSYNC	I	Horizontal sync
40	A15/CAS	O	Column address strobe for SD-RAM access	104	COR/RSTOUT	O	Output for contrast reduction
41	VSS33	--	GND	105	BLANK/CORBLA	O	Ys for OSD Teletext (blanking)
42	VDD33	I	3.3V	106	VDD33	I	3.3V
43	MEMCLK	O	Clock for SD-RAM	107	VSS33	--	GND
44	CSSDRAM	O	Chip select signal for SD-RAM device	108	XTAL1	I	System clock (4MHz)
45	CLKEN	O	Enable for memory clock	109	XTAL2	O	System clock (4MHz)
46	CSROM	O	Chip select signal for PP-ROM device	110	VSSA	--	GND
47	RD	O	External memory read strobe for PP-ROM	111	VDDA	I	2.5V
48	UDQM	O	Write disable for high byte	112	R	O	Red for OSD / Teletext
49	LDQM	O	Write disable for low byte	113	G	O	Green for OSD / Teletext
50	WR	O	Memory write strobe	114	B	O	Blue for OSD / Teletext
51	D15	I/O	Data bit for PP-RAM/SD-RAM	115	VSSA	--	GND
52	VSS33	--	GND	116	VDDA	--	2.5V
53	VDD33	I	3.3V	117	CVBS2	I	Composite video for WSS
54	D7	I/O	Data bit for PP-RAM/SD-RAM	118	VSSA	--	GND
55	D0	I/O	Data bit for PP-RAM/SD-RAM	119	VDDA	I	2.5V
56	D14	I/O	Data bit for PP-RAM/SD-RAM	120	CVBS1B	I	Ground for CVBS1A
57	D8	I/O	Data bit for PP-RAM/SD-RAM	121	CVBS1A	I	Composite video for Teletext decorder
58	D6	I/O	Data bit for PP-RAM/SD-RAM	122	VSSA	--	GND
59	D1	I/O	Data bit for PP-RAM/SD-RAM	123	VDDA	I	2.5V
60	VSS33	--	GND	124	P5.0	I	AFT voltage for tuner
61	VDD33	I	3.3V	125	P5.1	--	Not used
62	D13	I/O	Data bit for PP-RAM/SD-RAM	126	P5.2	I	AGC voltage for tuner
63	D9	I/O	Data bit for PP-RAM/SD-RAM	127	P5.3	--	Not used
64	D5	I/O	Data bit for PP-RAM/SD-RAM	128	TMODE	I	Test mode

SECTION 3
DISASSEMBLY

3.1 DISASSEMBLY PROCEDURE [AV-28H4BU, AV-28H4SU, AV-32H4BU, AV-32H4SU]

3.1.1 REMOVING THE REAR COVER

(1) Unplug the power cord.
(2) Remove the 13 screws **[A]** as shown in the Fig. 3.
(3) Withdraw the REAR COVER toward you.

3.1.2 REMOVING THE SIDE CONTROL JACK ASS'Y

- Remove the REAR COVER.
  (1) Remove the 1 screw **[B]** as shown in the Fig.3.
  (2) Slightly shift the SIDE CONTROL JACK ASS'Y to rear side and remove the 2 claws under the SIDE CONTROL JACK ASS'Y.
  (3) Disconnect the connector [CN810F] and [CN810K] as shown Fig. 3.

3.1.3 REMOVING THE SIDE CONTROL PWB

- Remove the REAR COVER.
- Remove the SIDE CONTROL JACK ASSY.
  (1) Remove the 2 screws **[C]** as shown in Fig. 3.
  (2) Remove the 2 claws **[D]** from back side of the SIDE CONTRL JACK ASS'Y as shown in Fig. 3.
  (3) Pull out the SIDE CONTROL PWB.

3.1.4 REMOVING THE CHASSIS

- Remove the REAR COVER.
  (1) Slightly raise the both sides of the chassis by hand and remove the 2 claws under the both sides of the CHASSIS from the front cabinet.
  (2) Withdraw the CHASSIS backward.
  (If necessary, take off the wire clamp, connectors etc.)

3.1.5 REMOVING THE POWER & DEF. PWB

- Remove the REAR COVER.
- Remove the CHASSIS.
  (1) Remove the 3 screws **[E]** as shown in Fig. 3.
  (2) Remove the POWER & DEF. PWB upper.
  (If necessary, take off the wire clamp, connectors etc.)

3.1.6 REMOVING THE AV TERMINAL BOARD

- Remove the REAR COVER.
  (1) Remove the 3 screws **[F]** as shown in the Fig. 3.
  (2) Remove the 2 claws **[G]** under the CHASSIS as shown in Fig. 2.
  (3) Remove the AV TERMINAL BOARD slightly in the direction of arrow **[H]** as shown in Fig. 2.

3.1.7 REMOVING THE SPEAKER GRIL

- Remove the REAR COVER.
  (1) Remove the 8 screws **[J]** as show in the.Fig. 3.
  (2) Remove the SPEAKER GRIL.

3.1.8 REMOVING THE SPEAKER

- Remove the REAR COVER.
- Remove the SPEAKER GRIL.
  (1) Remove the 4 screws **[K]** as show in the.Fig. 1.
  (2) Remove the SPEAKER.
  (3) Follow the same steps when removing the other hand SPEAKER.

3.1.9 CHECKING THE PW BOARD

- To check the back side of the PW Board.
  (1) Pull out the CHASSIS. (Refer to REMOVING THE CHASSIS).
  (2) Erect the CHASSIS vertically with the HVT side facing up so that you can easily check the back side of the PW board.

CAUTION:

- When erecting the CHASSIS, be careful so that there will be no contacting with other PW Board.
- Before turning on power, make sure that the wire connector is properly connected.
- When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE(BRAIDED ASS'Y) is connected to the CRT SOCKET PW board.

3.1.10 WIRE CLAMPING AND CABLE TYING

(1) Be sure to clamp the wire.
(2) Never remove the cable tie used for tying the wires together. Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

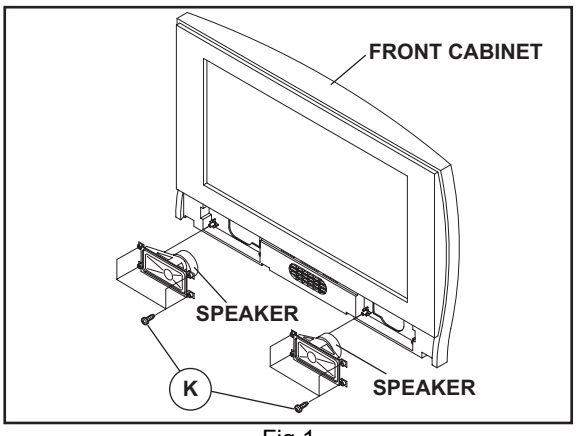


Fig.1

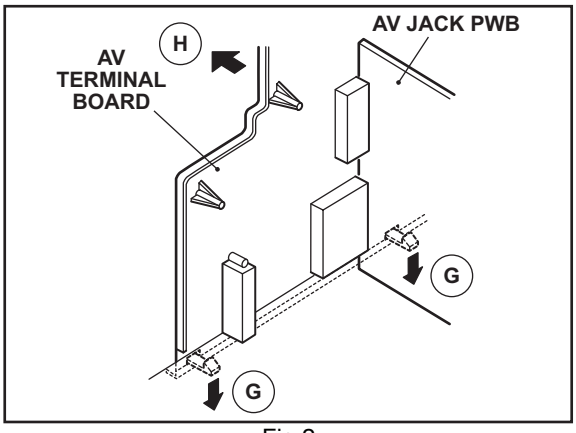


Fig.2

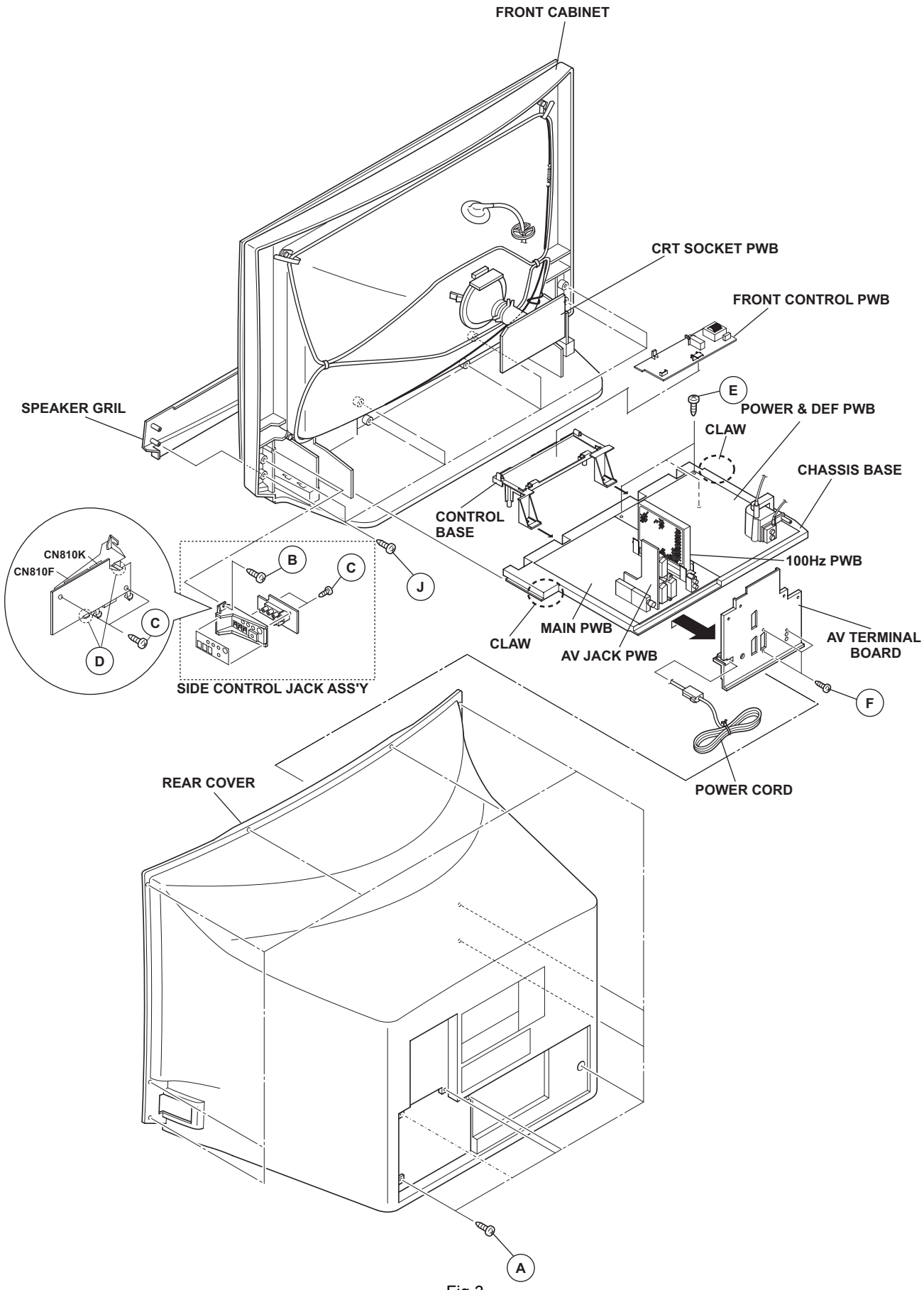

FRONT CABINET
CRT SOCKET PWB
FRONT CONTROL PWB
SPEAKER GRIL
E
POWER & DEF PWB
CLAW
CHASSIS BASE
CONTROL BASE
100Hz PWB
CN810K
CN810F
B
C
J
C
D
SIDE CONTROL JACK ASS'Y
CLAW
MAIN PWB
AV JACK PWB
AV TERMINAL BOARD
F
POWER CORD
REAR COVER
A

Fig.3

3.2 DISASSEMBLY PROCEDURE [AV-28H40SU, AV-28H77SK, AV-32H40SU, AV-32H47SU, AV-32H77SK]

3.2.1 REMOVING THE REAR COVER

(1) Unplug the power cord.
(2) Remove the 13 screws **[A]** as shown in the Fig. 3.
(3) Withdraw the REAR COVER toward you.

3.2.2 REMOVING THE SIDE CONTROL JACK ASS'Y

• Remove the REAR COVER.
(1) Remove the 1 screw **[B]** as shown in the Fig.3.
(2) While slightly raise the SIDE CONTROL JACK ASSY, remove the 2 claws under the SIDE CONTROL JACK ASSY.
(3) Disconnect the connector **[F]** and **[K]** as shown in Fig. 1.

3.2.3 REMOVING THE SIDE CONTROL PWB

• Remove the REAR COVER.
• Remove the SIDE CONTROL JACK ASSY.
(1) Remove the 3 claws **[C]** from back side of the SIDE CONTROL JACK ASSY as shown in Fig. 1.
(2) Pull out the SIDE CONTROL PWB.

3.2.4 REMOVING THE CHASSIS

• Remove the REAR COVER.
(1) Slightly raise the both sides of the chassis by hand and remove the 2 claws under the both sides of the CHASSIS from the front cabinet.
(2) Withdraw the CHASSIS backward.
(If necessary, take off the wire clamp, connectors etc.)

3.2.5 REMOVING THE POWER & DEF. PWB

• Remove the REAR COVER.
• Remove the CHASSIS.
(1) Remove the 3 screws **[D]** as shown in Fig. 3.
(2) Remove the POWER & DEF. PWB upper.
(If necessary, take off the wire clamp, connectors etc.)

3.2.6 REMOVING THE SIDE SPEAKER

• Remove the REAR COVER.
(1) Remove the 2 screws **[E]**, and remove the SPEAKER ADAPTER as shown in Fig. 3.

NOTE :

When removing the 2 screws **[E]** of the speaker holder remove the lower side screw first, and then remove the upper one.

(2) Remove the 4 screws **[F]** attaching the SPEAKER.
(3) Follow the same steps when removing the other hand SPEAKER.

3.2.7 REMOVING THE AV TERMINAL BOARD

• Remove the REAR COVER.
(1) Remove the 3 screws **[G]** as shown in the Fig. 3.
(2) Remove the 2 claws **[H]** under the CHASSIS as shown in Fig. 2.
(3) Remove the AV TERMINAL BOARD slightly in the direction of arrow **[I]** as shown in Fig. 2.

3.2.8 CHECKING THE PW BOARD

• To check the back side of the PW Board.
(1) Pull out the CHASSIS. (Refer to REMOVING THE CHASSIS).
(2) Erect the CHASSIS vertically so that you can easily check the back side of the PW Board.

CAUTION:

• When erecting the CHASSIS, be careful so that there will be no contacting with other PW Board.
• Before turning on power, make sure that the wire connector is properly connected.
• When conducting a check with power supplied, be sure to confirm that the CRT EARTH WIRE (BRAIDED ASS'Y) is connected to the CRT SOCKET PW board.

3.2.9 WIRE CLAMPING AND CABLE TYING

(1) Be sure to clamp the wire.
(2) Never remove the cable tie used for tying the wires together.Should it be inadvertently removed, be sure to tie the wires with a new cable tie.

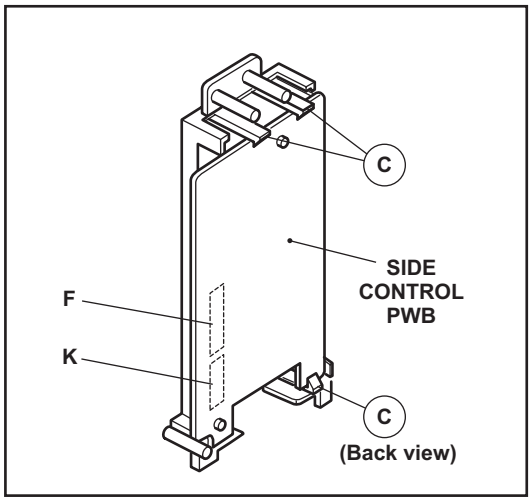


Fig.1

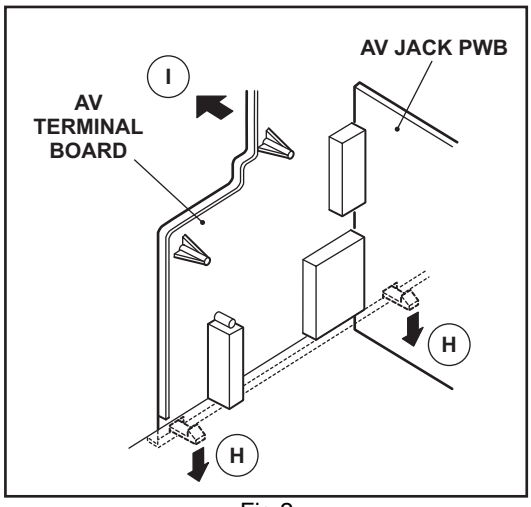


Fig.2

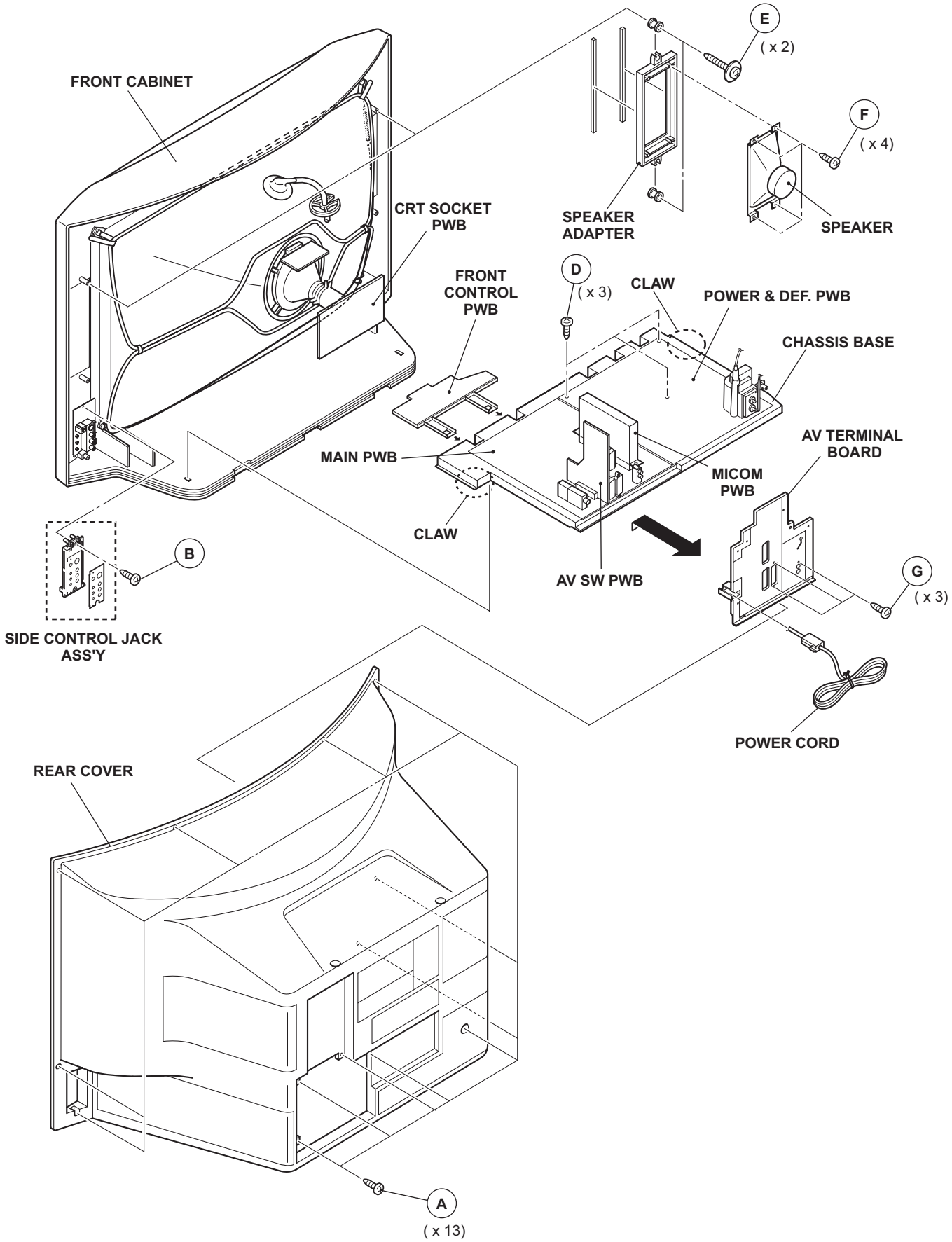

FRONT CABINET
E
(x 2)
F
(x 4)
SPEAKER ADAPTER
SPEAKER
CRT SOCKET PWB
FRONT CONTROL PWB
D
(x 3)
CLAW
POWER & DEF. PWB
CHASSIS BASE
MAIN PWB
AV TERMINAL BOARD
MICOM PWB
CLAW
AV SW PWB
G
(x 3)
B
SIDE CONTROL JACK ASS'Y
POWER CORD
REAR COVER
A
(x 13)

Fig.3

3.3 REMOVING THE CRT

NOTE:

- Replacement of the CRT should be performed by 2 or more persons.
- After removing the REAR COVER, CHASSIS etc.,

(1) Putting the CRT change table on soft cloth, the CRT change table should also be covered with such soft cloth (shown in Fig. 4).

(2) While keeping the surface of CRT down, mount the TV set on the CRT change table balanced will as shown in Fig. 4.

(3) Remove 4 screws marked by arrows with a box type screwdriver as shown in Fig. 5.

NOTE:

Since the cabinet will drop when screws have been removed, be sure to support the cabinet with hands.

(4) After 4 screws have been removed, put the cabinet slowly on cloth (At this time, be carefully so as not to damage the front
surface of the cabinet) shown in Fig. 6.

NOTE:

- The CRT should be assembled according to the opposite sequence of its dismounting steps.
- The CRT change table should preferably be smaller that the CRT surface, and its height be about 35cm.

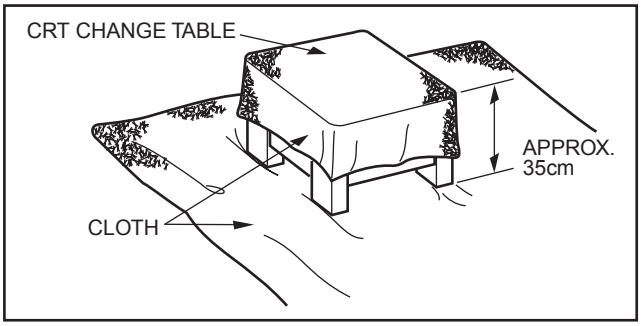


Fig.4

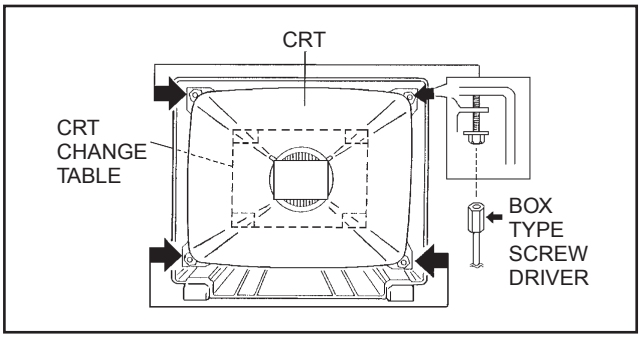


Fig.5

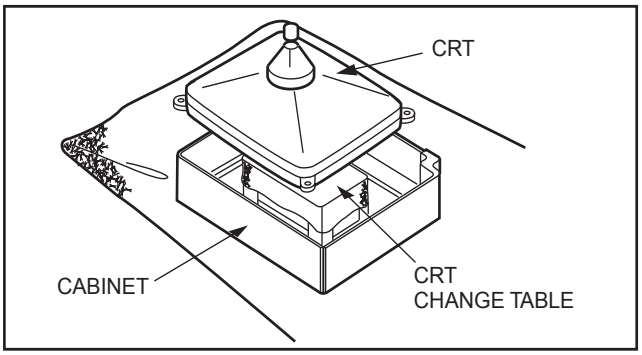


Fig.6

COATING OF SILICON GREASE FOR ELECTRICAL INSULATION ON THE CRT ANODE CAP SECTION.

Subsequent to replacement of the CRT and HV transformer or repair of the anode cap, etc. by dismounting them, be sure to coat silicon grease for electrical insulation as shown in Fig.7.Wipe around the anode button with clean and dry cloth. (Fig.7)Coat silicon grease on the section around the anode button. At this time, take care so that any silicon greases dose not sticks to the anode button. (Fig.8)

Silicon grease product No. KS - 650N

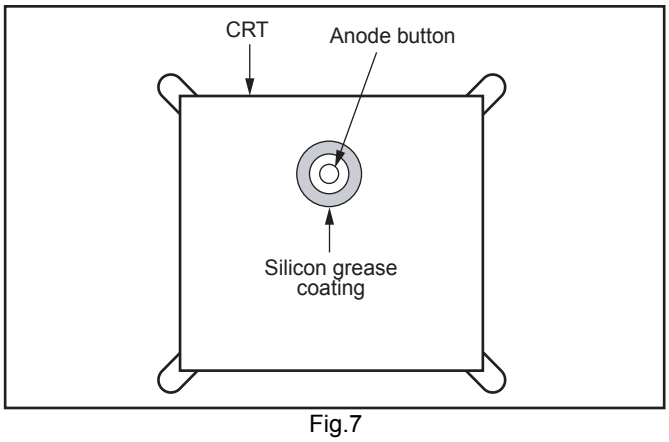


Fig.7

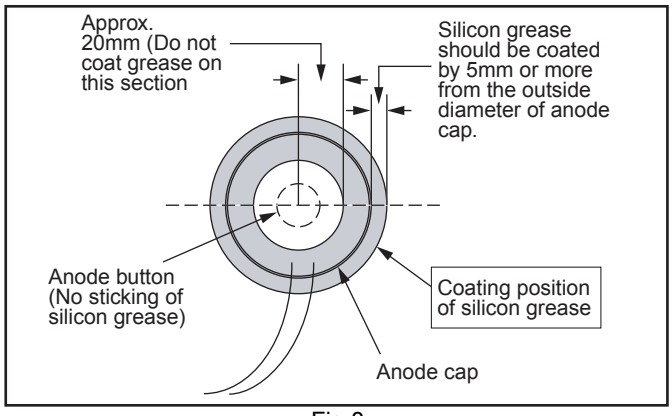


Fig.8

3.4 MEMORY IC REPLACEMENT

- This model uses the memory IC.
- This memory IC stores data for proper operation of the video and drive circuits.
- When replacing, be sure to use an IC containing this (initial value) data.

3.4.1 MEMORY IC REPLACEMENT PROCEDURE

1. Power off
Switch off the power and disconnect the power plug from the AC outlet.

2. Replace the memory IC
Be sure to use the memory IC written with the initial setting values.

3. Power on
Connect the power plug to the AC outlet and switch on the power.

4. System constant check and setting
* It must not adjust without signal.
(1) Press the [INFORMATION] key and the [MUTING] key of the REMOTE CONTROL UNIT simultaneously.
(2) The SERVICE MENU screen of Fig. 1 will be displayed.
(3) While the SERVICE MENU is displayed, press the [INFORMATION] key and [MUTING] key simultaneously, and the SYSTEM CONSTANT SET screen of Fig. 2 will be displayed.
(4) Check the setting values of the SYSTEM CONSTANT SET. If the value is different, select the setting item with the [FUNCTION UP/DOWN] key, and set the correct value with the [FUNCTION -/+] key.
(5) Press the [MENU] key to memorize the setting value.
(6) Press the [INFORMATION] key twice, and return to the normal screen.

5. Receiving channel setting
Refer to the OPERATING INSTRUCTIONS and set the receive channels (Channels Preset) as described.

6. User settings
Check the user setting items according to the given in page later.
Where these do not agree, refer to the OPERATING INSTRUCTIONS and set the items as described.

7. SERVICE MENU setting
Verify what to set in the SERVICE MENU, and set whatever is necessary (Fig.1).
Refer to the SERVICE ADJUSTMENT for setting.

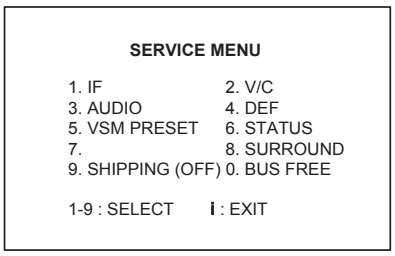


Fig.1

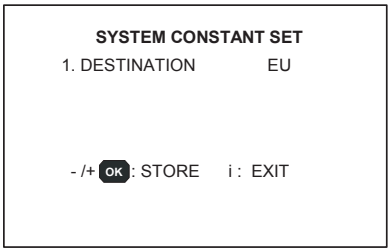


Fig.2

NAME OF REMOTE CONTROL KEY

Names of key	key
INFORMATION	
MUTING	
MENU	
FUNCTION UP/DOWN	
FUNCTION -/+	

3.4.2 SYSTEM CONSTANT SETTING

Setting item	Setting content	Setting value			
		AV-28H4BU AV-28H4SU AV-28H40SU	AV-32H4BU AV-32H4SU AV-32H40SU AV-32H47SU	AV-28H77SK	AV-32H77SK
1.DESTINATION	EU / EK / EI	EU	←	EK	←
2.CRT TYPE	16:9 / 4:3	16:9	←	←	←
3.PICTURE TILT	YES / NO	NO	YES	NO	YES
4.POWER BASS	YES / NO	NO	←	←	←
5.SPATIAL SURR	YES / NO	NO	←	←	←
6.PIC&TEXT	YES / NO	NO	←	YES	←
7.PROGRESSIVE	YES / NO	NO	←	←	←

3.4.3 SETTINGS OF FACTORY SHIPMENT

3.4.3.1 BUTTON OPERATION

Setting item	Setting position
POWER	Off
CHANNEL	PR1
VOLUME	10

3.4.3.2 REMOTE CONTROL DIRECT OPERATION

Setting item	Setting position
CHANNEL	PR1
VOLUME	10
ZOOM	PANORAMIC
HYPER SOUND	OFF

3.4.3.3 REMOTE CONTROL MENU OPERATION

(1) PICTURE SETTING

Setting item	Setting position
PICTURE MODE	STANDARD
CONTRAST / BRIGHT SHARP / COLOUR / HUE	Refer to [5. VSM PRESET]
COLOUR TEMP	COOL

(2) PICTURE FEATURES

Setting item	Setting position
DIGITAL VNR	AUTO
DigiPure Pro	AUTO
COLOUR SYSTEM	TV : According to preset CH
	EXT : AUTO
4:3 AUTO ASPECT	PANORAMIC
PICTURE TILT [32” model]	MIDDLE

(3) SOUND SETTING

Setting item	Setting position
STEREO / I•II	Stereo sound
BASS	Centre
TREBLE	Centre
BALANCE	Centre
HYPER SOUND	OFF

(4) EXT SETTING

Setting item	Setting position
ID	BLANK
S-IN	BLANK
DUBBING	EXT-1 → EXT-2

(5) FEATURES

Setting item	Setting position
SLEEP TIMER	OFF
CHILD LOCK	Refer to OPERATION INSTRUCTIONS
BLUE BACK	ON
DECODER (EXT-2)	OFF

(6) INSTALL

Setting item	Setting position
LANGUAGE	ENGLISH
AUTO PROGRAM	TV channel automatically set
EDIT/MANUAL	PRESET CH only
	The others : BLANK

3.4.4 SERVICE MENU SETING ITEMS

<table>
<tr><th>Setting item</th><th>Setting value</th><th>Setting item</th><th colspan="2">Setting value</th></tr>
<tr><td rowspan="2">1. IF</td><td rowspan="2">1. VCO
2. ATT ON/OFF</td><td rowspan="2">5. VSM PRESET</td><td>BRIGHT/SOFT/STD</td><td>COOL/WARM/NOMAL</td></tr>
<tr><td>1.CONT.
2.BRIGHT
3.SHARP
4.COLOUR
5.HUE</td><td>1.WDR R
2.WDR G
3.WDR B</td></tr>
<tr><td>2. V / C</td><td>1.RGB BLK
2.CUTOFF R
3.CUTOFF G
4.CUTOFF B
5.WDR R
6.WDR G
7.WDR B
8.BRIGHT
9.CONTRAST
10.COLOUR
11.HUE
12.SHARP
13.SC ADJ.
14.SIDE.P.L
15.SIDE.P.R</td><td>6.STATUS
(Do not adjust)</td><td colspan="2">1.SOFT
2.TELETEXT
3.ASPECT
4.PROTECT
5.FLASH</td></tr>
<tr><td>3. AUDIO
(Do not adjust)</td><td>1.ERR LIMIT
2.A2 ID THR
3.SYSTEM</td><td rowspan="2">9.SHIPPING
(Do not adjust)</td><td colspan="2" rowspan="2">ON/OFF</td></tr>
<tr><td>4. DEF.</td><td>1.V-SHIFT
2.V-SIZE
3.H-CENT
4.H-SIZE
5.TRAPEZ
6.EW-PIN
7.COR-UP
8.COR-LO
9.COR-UP-S
10.COR-LO-S
11.ANGLE
12.BOW
13.V-S.CR
14.V-LIN</td></tr>
</table>

3.5 REPLACEMENT OF CHIP COMPONENT

3.5.1 CAUTIONS

(1) Avoid heating for more than 3 seconds.
(2) Do not rub the electrodes and the resist parts of the pattern.
(3) When removing a chip part, melt the solder adequately.
(4) Do not reuse a chip part after removing it.

3.5.2 SOLDERING IRON

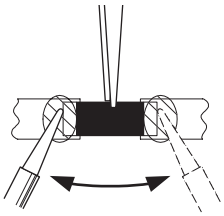
(1) Use a high insulation soldering iron with a thin pointed end of it.
(2) A 30w soldering iron is recommended for easily removing parts.

3.5.3 REPLACEMENT STEPS

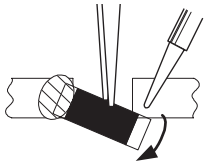
1. How to remove Chip parts

[Resistors, capacitors, etc.]

(1) As shown in the figure, push the part with tweezers and alternately melt the solder at each end.



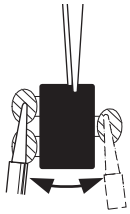
(2) Shift with the tweezers and remove the chip part.



[Transistors, diodes, variable resistors, etc.]

(1) Apply extra solder to each lead.

(2) As shown in the figure, push the part with tweezers and alternately melt the solder at each lead. Shift and remove the chip part.



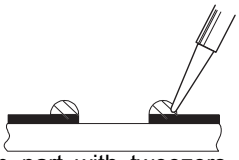
NOTE :

After removing the part, remove remaining solder from the pattern.

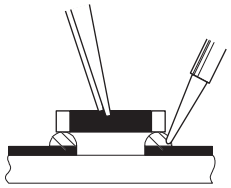
2. How to install Chip parts

[Resistors, capacitors, etc.]

(1) Apply solder to the pattern as indicated in the figure.

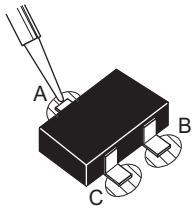


(2) Grasp the chip part with tweezers and place it on the solder. Then heat and melt the solder at both ends of the chip part.

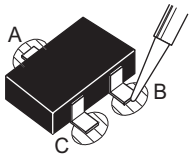


[Transistors, diodes, variable resistors, etc.]

(1) Apply solder to the pattern as indicated in the figure.
(2) Grasp the chip part with tweezers and place it on the solder.
(3) First solder lead **A** as indicated in the figure.



(4) Then solder leads **B** and **C**.



SECTION 4
ADJUSTMENT

4.1 ADJUSTMENT PREPARATION

(1) **There are 2 ways of adjusting this TV : One is with the REMOTE CONTROL UNIT and the other is the conventional method using adjustment parts and components.**
(2) **The adjustment using the REMOTE CONTROL UNIT is made on the basis of the initial setting values. The setting values which adjust the screen to the optimum condition can be different from the initial setting values.**
(3) Make sure that connection is correctly made AC to AC power source.
(4) Turn on the power of the TV and measuring instruments for warning up for at least 30 minutes before starting adjustments.
(5) If the receive or input signal is not specified, use the most appropriate signal for adjustment.
(6) Never touch the parts (such as variable resistors, transformers and condensers) not shown in the adjustment items of this service adjustment.

4.2 PRESET SETTING BEFORE ADJUSTMENT

Unless otherwise specified in the adjustment items, preset the following functions with the REMOTE CONTROL UNIT.

Item	Preset value
PICTURE MODE	STD
CONTRAST / BRIGHTSHARP / COLOUR / HUE	Centre
COLOUR TEMP	NORMAL
DIGITAL VNR	AUTO
BASS / TREBLE / BALANCE	Centre
HYPER SOUND	OFF
ZOOM	FULL
SLEEP TIMER	OFF

4.3 MEASURING INSTRUMENT AND FIXTURES

(1) DC voltmeter (or digital voltmeter)
(2) Oscilloscope
(3) Signal generator (Pattern generator)
[PAL / SECAM / NTSC]
(4) Remote control unit

4.4 ADJUSTMENT ITEMS

■ **CHECK ITEM**
- B1 POWERSUPPLY check
- HIGH VOLTAGE check
- IF VCO check

■ **FOCUS**
- FOCUS adjustment

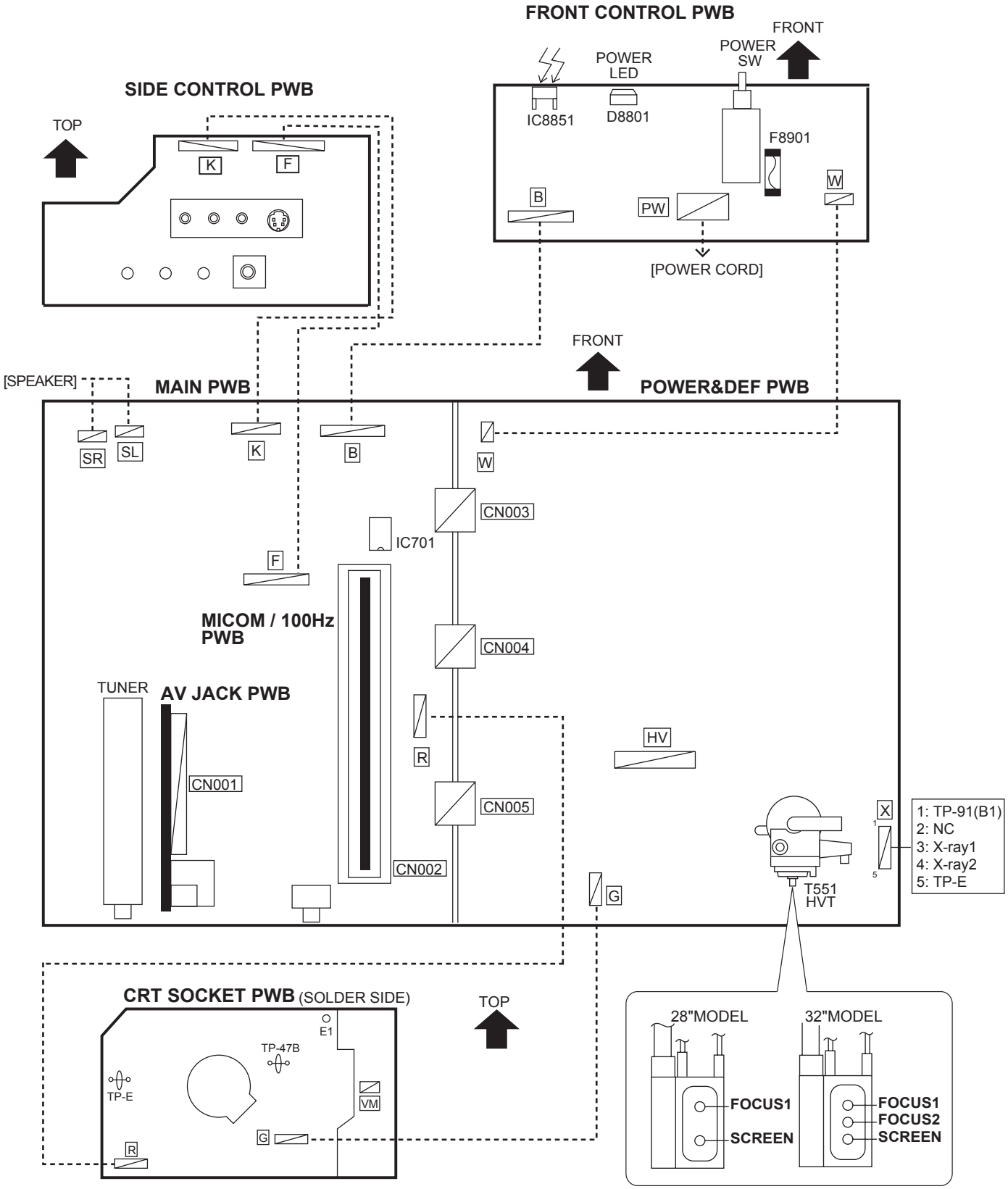
■ **DEFLECTION CIRCUIT**
- V.POSITION adjustment
- V.SIZE adjustment
- H. POSITION adjustment
- H.SIZE adjustment
- SIDE-PIN adjustment
- TRAPEZIUM adjustment
- CORNER adjustment
- ANGLE adjustment
- BOW adjustment
- V.S-SHAPE CORRECTION & V.LINEARITY adjustment

■ **VIDEO CIRCUIT**
- WHITE BALANCE adjustment
- SUB BRIGHT adjustment
- SUB CONTRAST adjustment
- SUB COLOUR Ⅰ adjustment
- SUB COLOUR Ⅱ adjustment
- SUB HUE Ⅰ adjustment
- SUB HUE Ⅱ adjustment

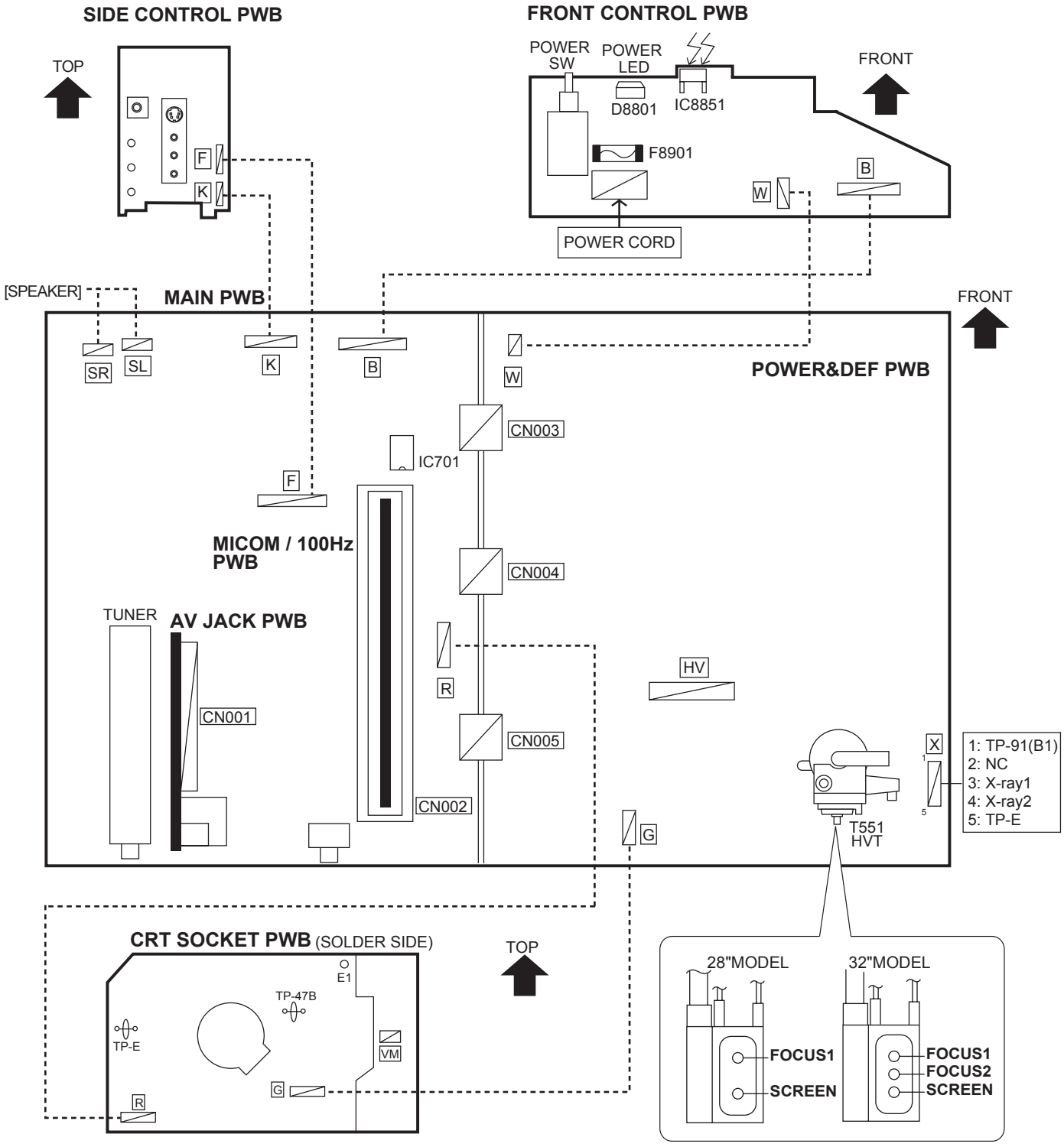
■ **VSM PRESET SETTING**
- VSM PRESET setting

4.5 ADJUSTMENT LOCATIONS

4.5.1 AV-28H4BU, AV-28H4SU, AV-32H4BU, AV-32H4SU



4.5.2 AV-28H40SU, AV-28H77SK, AV-32H40SU, AV-32H47SU,AV-32H77SK



4.6 BASIC OPERATION OF SERVICE MENU

4.6.1 TOOL OF SERVICE MENU OPERATION

Operate the SERVICE MENU with the REMOTE CONTROL UNIT.

4.6.2 SERVICE MENU ITEMS

With the SERVICE MENU, various adjustments can be made, and they are broadly classified in the following items of settings.

1.IF	This mode adjusts the setting values of the IF circuit.
2.V/C	This mode adjusts the setting values of the VIDEO circuit.
3.AUDIO	This mode adjusts the setting values of the MULTI-SOUND circuit. **[Do not adjust]**
4.DEF	This mode adjusts the setting values of the DEFLECTION circuit.
5.VSM PRESET	This mode adjusts the setting values of COOL, NORMAL and WARM. (VSM : Video Status Memory)
6.STATUS	This mode is shows the monitor of SOFT, TELETEXT, ASPECT, PROTECT, FLASH. **[Do not adjust]**
9.SHIPPING (OFF)	This mode is set at shipping. **[Do not adjust]**
0.BUS FREE	This mode is set at bus free. **[Do not adjust]**

4.6.3 BASIC OPERATION OF SERVICE MENU

(1) HOW TO ENTER SERVICE MENU

Press the [INFORMATION] key and the [MUTING] key of the REMOTE CONTROL UNIT simultaneously, and the SERVICE MENU screen of Fig.1 will be displayed.

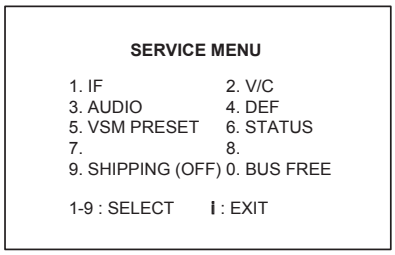


Fig.1

(2) SELECTION OF SUB MENU SCREEN

Press one of [1] - [5] keys of the REMOTE CONTROL UNIT and select the SUB MENU SCREEN (See “SERVICE MENU FLOW CHART”), form the SERVICE MENU.

NAME OF REMOTE CONTROL KEY

Names of key	Key
INFORMATION	
MUTING	
MENU	
FUNCTION UP/DOWN	
FUNCTION -/+	

Fig.2

(3) METHOD OF SETTING

- **1.IF**

[1.VCO] : It must not adjust without signal.

Key	Function
(1) [1]	Select 1.IF
(2) [1]	Select 1.VCO (CW) Make sure that the arrow position between the ABOVE REF and BELOW REF.
(3) [INFORMATION]	Return to the SERVICE MENU screen.

- **2.V/C, 4.DEF AND 5.VSM PRESET.**

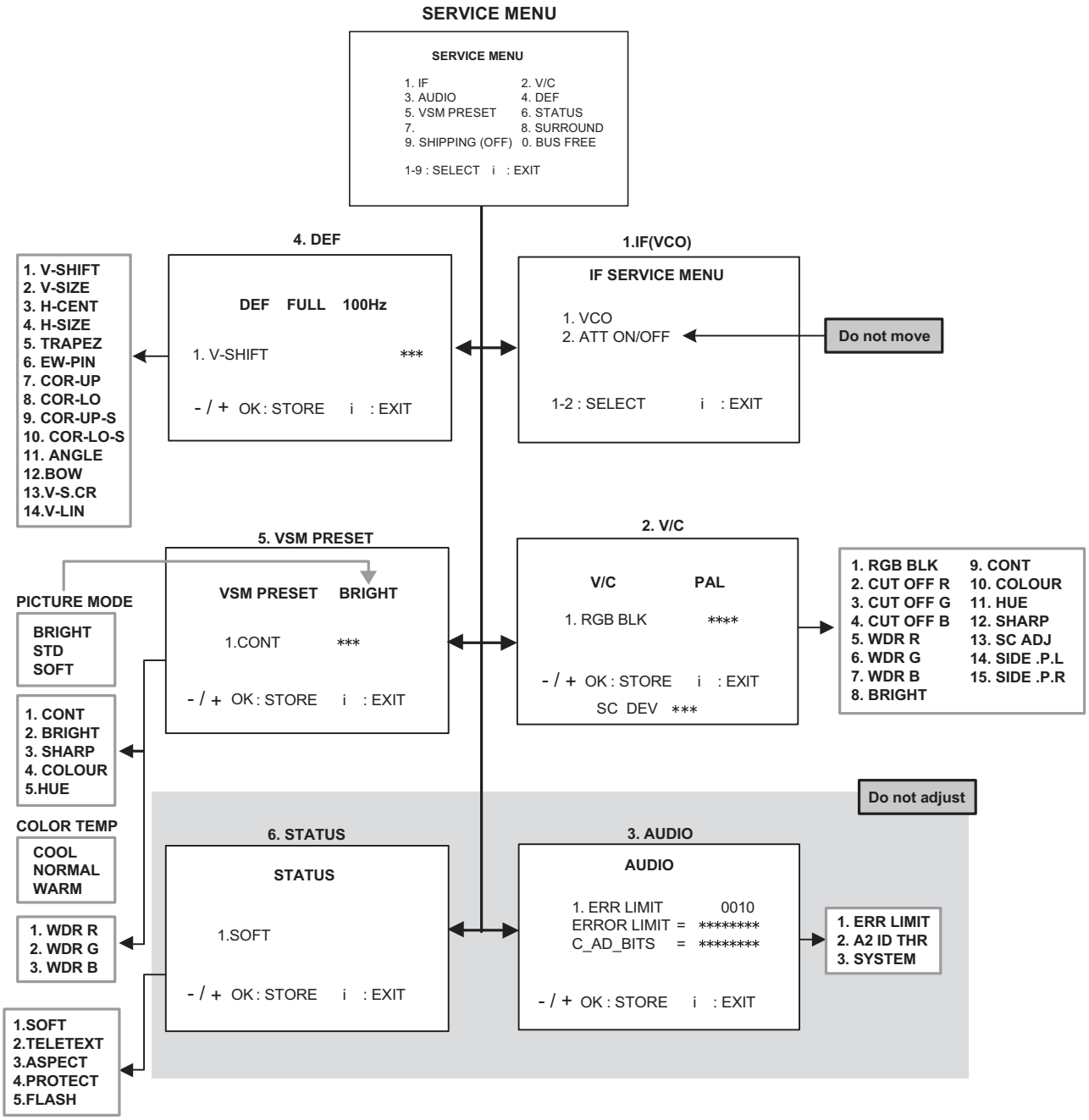
Key	Function
(1) [2] / [4] / [5]	Select one from 2.V/C, 4.DEF and 5.VSM PRESET.
(2) [FUNCTION UP / DOWN (▲ / ▼)]	Select setting items.
(3) [FUNCTION -/+ (◀ / ▶)]	Set (adjust) the setting values of the setting items.
(4) [OK]	Memorize the setting value.(Before storing the setting values in memory, do not press the CH, TV, POWER ON / OFF key if you do, the values will not be stored in memory.)
(5) [INFORMATION]	Return to the SERVICE MENU screen.

- **3.AUDIO, 6.STATUS, and 9.SHIPPING.**
  [Do not setting]

(4) RELEASE OF SERVICE MENU

After completing the setting, return to the SERVICE MENU, then again press the [INFORMATION] key.

4.6.4 SERVICE MENU FLOW CHART



4.7 INITIAL SETTING VALUE OF SERVICE MENU

(1) Adjustment of the SERVICE MENU is made on the basis of the initial setting values. However, the new setting values which displays on the screen in its optimum condition may differ from the initial setting value.
(2) Do not change the initial setting values of the items not listed in “ADJUSTMENTS PROCEDURE”.
(3) “---” is impossible to adjust or not requirement to adjustment.

4.7.1 [2. V/C]

Setting item	Variable range	Initial setting value		
		PAL	SECAM	NTSC
1.RGB BLK	---	---	---	---
2.CUTOFF R	0000~0255	0100	0100	0100
3.CUTOFF G	0000~0255	0132	0132	0132
4.CUTOFF B	0000~0255	0124	0124	0124
5.WDR R	0000~0255	0165	0165	0165
6.WDR G	0000~0255	0135	0135	0135
7.WDR B	0000~0255	0150	0150	0150
8.BRIGHT	-128~0127	-030	-030	-030
9.CONTRAST	0000~0063	0040	0040	0040

Setting item	Variable range	Initial setting value			
		PAL	SECAM	NTSC 3.58	NTSC 4.43
10.COLOUR	0000~0063	0036	0031	0025	0000
11.HUE	-064~0063	---	---	0002	0000

Setting item	Variable range	Initial setting value					
		PAL		SECAM		NTSC	
		TV	EXT	TV	EXT	TV	EXT
12.SHARP	-015~0015	-002	0000	-002	0000	-002	0000

Setting item	Variable range	Initial setting value		
		PAL	SECAM	NTSC
13.SC ADJ.	0000~0063	0018	---	---

Setting item	Variable range	Initial setting value					
		PAL		SECAM		NTSC	
		REGULAR	14:9 ZOOM	REGULAR	14:9 ZOOM	REGULAR	14:9 ZOOM
14.SIDE .P.L	0000~1295	0322	0284	0322	0284	0328	0290
15.SIDE .P.R	0000~1295	1096	1137	1096	1137	1108	1150

4.7.2 [3. AUDIO] [Do not adjust]

Setting item	Variable range	Fixed value
1. ERR LIMIT	0000~00FF	0010
2. A2 ID THR	0000~00FF	0019
3. SYSTEM	---	---

4.7.3 [5. VSM PRESET]

Item	Variable range	Setting value					
		PICTURE MODE			COLOUR TEMP.		
		BRIGHT	STANDARD	SOFT	COOL	NORMAL	WARM
1.CONT	-16~+16	+7	0	-3	---	---	---
2.BRIGHT	-16~+16	0	0	0	---	---	---
3.SHARP	-16~+16	0	0	-2	---	---	---
4.COLOUR	-16~+16	0	0	0	---	---	---
5.HUE	-16~+16	0	0	0	---	---	---
1.WDR R	-64~+64	---	---	---	-15	0	4
2.WDR G	-64~+64	---	---	---	-9	0	0
3.WDR B	-64~+64	---	---	---	0	0	0

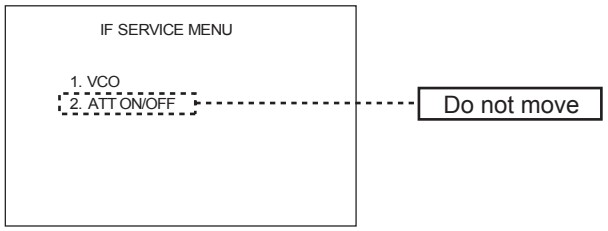
4.7.4 [4. DEFLECTION]

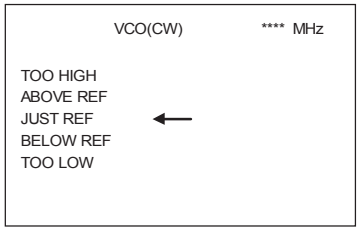
Setting item	Variable range	Initial setting value					
		FULL		PANORAMIC		SUBTITLE	
		100Hz i	120Hz i	100Hz i	120Hz i	100Hz i	120Hz i
1. V-SHIFT	-032~0031	0000	0000	0000	0000	0005	0000
2. V-SIZE	-064~0063	-033	0000	0005	0000	0017	0000
3. H-CENT	-128~0127	-014	0000	0000	0000	0000	0000
4. H-SIZE	-128~0127	0000	0000	0000	0000	0000	0000
5. TRAPEZ	-064~0064	-011	0000	0000	0000	0000	0000
6. EW-PIN	-128~0127	-035	0000	0000	0000	0000	0000
7. COR-UP	-064~0064	0000	0000	0000	0000	0000	0000
8. COR-LO	-064~0064	0000	0000	0000	0000	0010	0000
9. COR-UP-S	-064~0064	0000	0000	0000	0000	0000	0000
10. COR-LO-S	-064~0064	0000	0000	0000	0000	0000	0000
11.ANGLE	-128~0127	0000	0000	0000	0000	0000	0000
12.BOW	-128~0127	0000	0000	0000	0000	0000	0000
13.V-S.CR	-064~0063	0003	0000	0005	0000	0008	0000
14.V-LIN	-064~0063	0000	0000	-004	0000	-008	0000

4.8 ADJUSTMENTS PROCEDURE

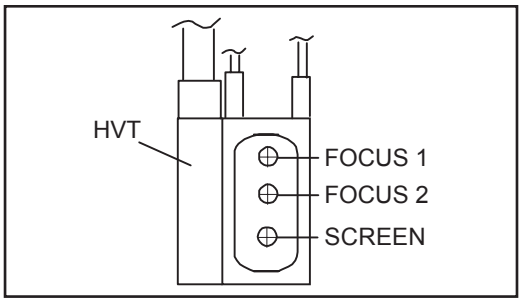
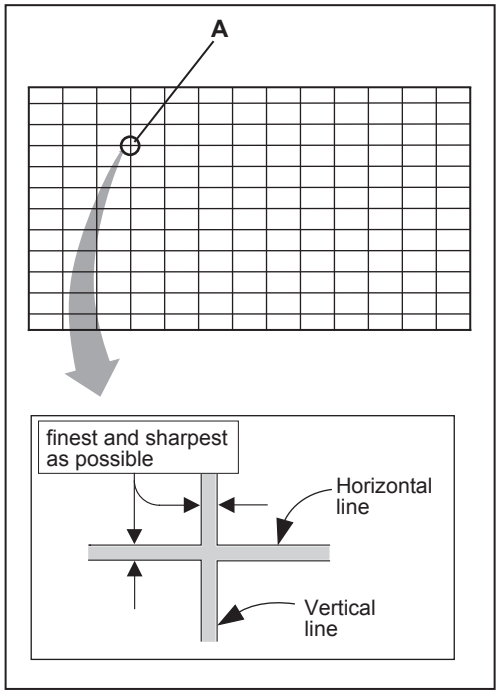
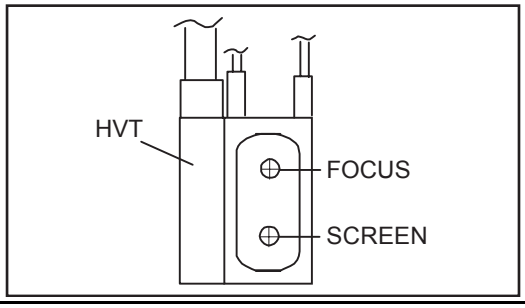
4.8.1 CHECK ITEM

Item	Measuring instrument	Test point	Adjustment part	Description
B1 POWER SUPPLY check	DC voltmeter Remote control unit	X connector 1-pin:TP-91(B1) 5-pin:TP-E [POWER DEF PWB]	[2.V/C] 1.RGB BLK	(1) Receive the any broadcast. (2) Select 2. V/C from the SERVICE MENU. (3) Select < 1. RGB BLK >. (4) Press the [FUNCTION + (▸)] key to find the cut off screen (Black screen). (5) Connect a DC voltmeter to TP-91(B1) and TP-E. (6) Make sure that the voltage is DC139V ± 2.0V. (7) Press the [FUNCTION - (◂)] key to return to service menu.
HIGH VOLTAGE check	HV voltmeter Remote control unit	CRT anode Chassis GND	[2.V/C] 1.RGB BLK	(1) Receive the any broadcast. (2) Select 2. V/C from the SERVICE MENU. (3) Select < 1. RGB BLK >. (4) Press the [FUNCTION + (▸)] key to find the cut off screen (Black screen). (5) Connect a HV voltmeter to CRT ANODE and chassis GND. (A ground side is connected previously) (6) Make sure that the voltage is DC 31.0kV (+1kV / -1.5kV). (7) Press the [FUNCTION - (◂)] key to return to service menu. **NOTE:** When removing a prove, an anode side is removed previously.
IF VCO check	Remote control unit		[1.IF] 1.VCO	• Under normal conditions, no adjustment is required. • It must not adjust without broadcast signal. (1) Receive the any broadcast. (2) Select 1.IF from the SERVICE MENU. (3) Select < 1.VCO >. (4) Check the ←(arrow) position between the ABOVE REF. and BELOW REF.





4.8.2 FOCUS

Item	Measuring instrument	Test point	Adjustment part	Description
FOCUS [32" MODELS]	Signal generator		FOCUS 1 VR FOCUS 2 VR [In HVT]	(1) Receive the crosshatch signal. (2) Set the ZOOM mode to FULL. (3) By turning the FOCUS 2 VR, adjust the picture so that the A part vertical line may become thinnest (Fig.1) . (4) By turning the FOCUS 1 VR, adjust the picture so that the A part horizontal line may become uniform at the line centre and its periphery (Fig.1) . (5) Make sure that when the screen is darkened, the lines remain in good focus. 
				 Fig.1
FOCUS [28" MODELS]	Signal generator		FOCUS VR [In HVT]	(1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) While looking at the screen, adjust the FOCUS VR to the vertical and horizontal lines will be clear and infine detail. (Fig.1) (4) Make sure that the picture is in focus even when the screen gets darkened. 

4.8.3 DEFLECTION CIRCUIT

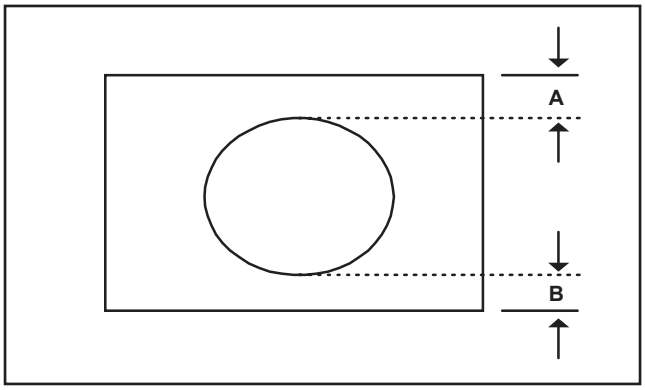
There are 3 aspect modes (1.FULL, 2.PANORAMIC, 3.SUBTITLE) of the adjustment.
Depending upon the kind of signals (Vertical frequency 100Hz i / 60Hz p).
100Hz i is a signal that is output to a screen when a 50Hz signal is input to a television set. It is an interlace-scanned picture of 100Hz.

- When the 100Hz FULL mode has been established, the setting of other modes will be done automatically. However, if the picture quality has not been optimized, adjust each mode again, respectively.
- The adjustment using the remote control unit is made on the basis of the initial setting values.
- The setting values which adjust the screen to the optimum condition can be different from the initial setting values.
- To switch aspect modes, use the [ZOOM] key of the remote controller.

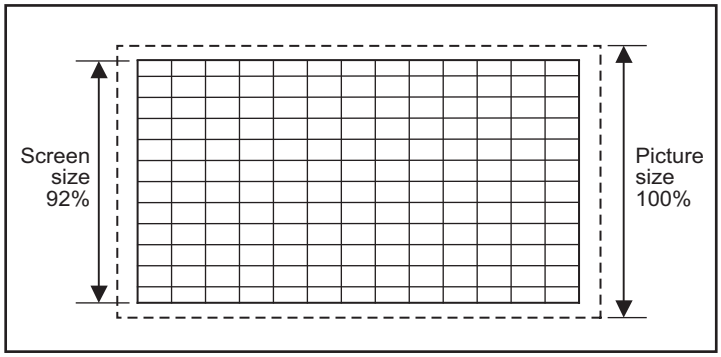
NOTE :

- Do not adjust PANORAMIC & SUBTITLE mode.
- At first the adjustment in 100Hz FULL mode should be done, then the data for the other aspect mode is corrected in the respective value at the same time. And confirm the deflection adjustment initial setting value in 60Hz (NTSC EXT mode) FULL mode. If the adjustment in 100Hz each aspect mode has been done and stored, the data for the same aspect modes in 60Hz is corrected in the respective value. Only the data for the other aspect mode in 60Hz is corrected for itself.

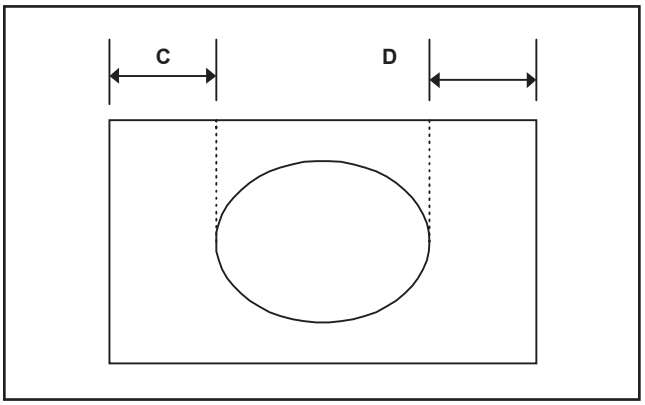
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>V. POSITION</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
1.V- SHIFT</td><td rowspan="2">(1) Receive the circle pattern signal of vertical frequency 50Hz (PAL / SECAM).
(2) Set the ZOOM mode to FULL.
(3) Select 4.DEF from the SERVICE MENU.
(4) Select < 1.V-SHIFT >.
(5) Set the initial setting value of < 1.V-SHIFT >.
(6) Adjust vertical position to make A = B.
(7) Check the adjustment value above in other zoom mode. If it is a wrong adjustment, re-adjust in FULL mode and adjust by < 1.V-SHIFT >.
(8) Press the [MENU] key and memorize the set value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>V.SIZE</td><td>Signal generator

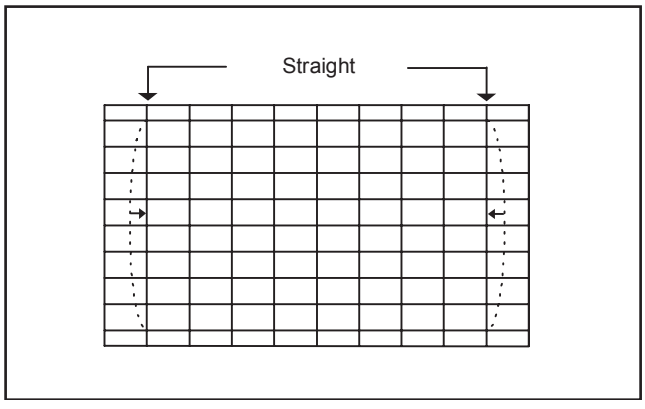
Remote control unit</td><td></td><td>[4.DEF]
2.V-SIZE</td><td rowspan="2">(1) Receive the cross-hatch signal.
(2) Set the ZOOM mode to FULL.
(3) Select 4.DEF from the SERVICE MENU.
(4) Select < 2.V-SIZE >.
(5) Set the initial setting value of < 2.V-SIZE >.
(6) Adjust to make sure that the vertical screen size of the picture size is in the bellow table.
(7) Make sure that the vertical screen size of the each ZOOM mode is in the below table.
(8) Press the [MENU] key and memorize the set value.
(9) Input a NTSC VIDEO signal (60Hz) from the EXT terminal, and make sure that the vertical screen size is in the table below.
(10) Press the [MENU] key and memorize the set value.

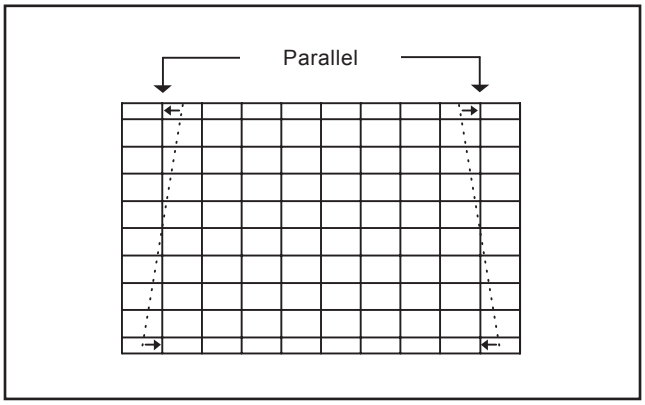
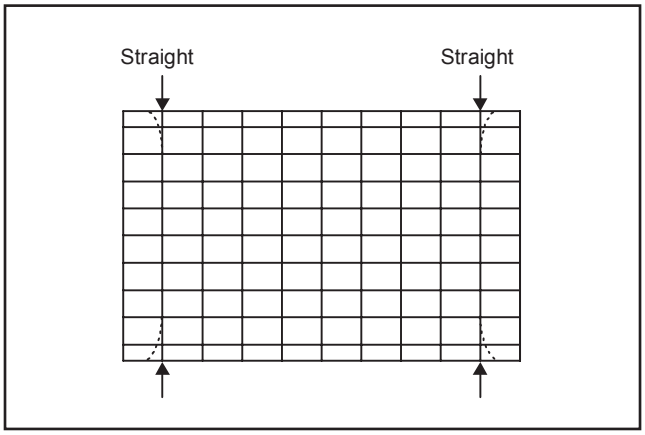
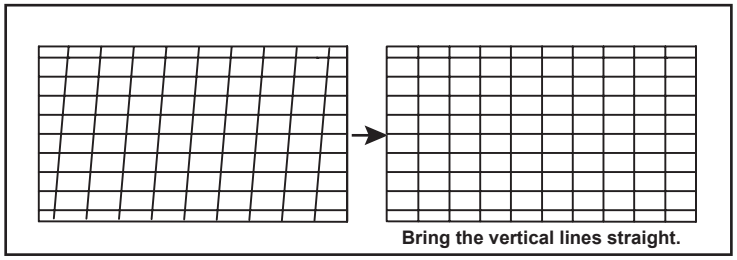
[SCREEN SIZE]
<table><tr><th>ZOOM MODE</th><th>FULL</th><th>PANORAMIC</th><th>SUBTITLE</th></tr><tr><td>SCREEN TOP</td><td>92%</td><td>87%</td><td>70%</td></tr><tr><td>SCREEN BOTTOM</td><td>92%</td><td>87%</td><td>83%</td></tr></table></td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

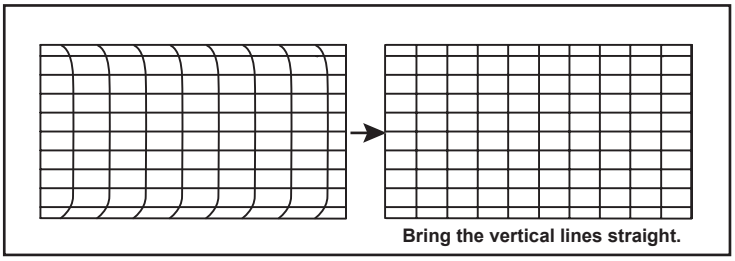
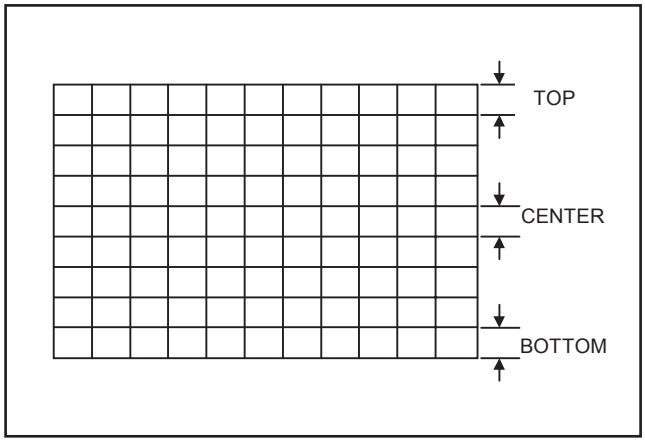
<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>H. POSITION</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
3.H-CENT</td><td rowspan="2">(1) Receive the circle pattern signal.
(2) Set the ZOOM mode to FULL.
(3) Select 4.DEF from the SERVICE MENU.
(4) Select < 3.H-CENT >.
(5) Set the initial setting value of < 3.H-CENT >.
(6) Adjust horizontal position to make C=D.
(7) Press the [MENU] key and memorize the set value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
<tr><td>H.SIZE</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
4.H-SIZE</td><td rowspan="2">(1) Receive the circle pattern signal.
(2) Set the ZOOM mode to FULL.
(3) Select 4.DEF from the SERVICE MENU.
(4) Select < 4.H-SIZE >.
(5) Set the initial setting value of < 4.H-SIZE >.
(6) Adjust to make sure that the horizontal screen size of the picture size is in the bellow table.
(7) Make sure that the horizontal screen size of the each ZOOM mode is in the below table.
(8) Press the [MENU] key and memorize the set value.</td></tr>
<tr><td colspan="4">[SCREEN SIZE]
<table><tr><th>ZOOM MODE</th><th>FULL</th><th>PANORAMIC</th><th>SUBTITLE</th></tr><tr><td>H SIZE</td><td>92%</td><td>95%</td><td>92%</td></tr></table></td></tr>
<tr><td>SIDE-PIN</td><td>Signal generator

Remote control unit</td><td></td><td>[4.DEF]
6.EW-PIN</td><td rowspan="2">(1) Receive the cross-hatch signal.
(2) Set the ZOOM mode to FULL.
(3) Select 4.DEF from the SERVICE MENU.
(4) Select < 6.EW-PIN >.
(5) Set the initial setting value of < 6.EW-PIN >.
(6) Adjust to make the 2nd vertical lines at the left and right edges of the screen straight. Also make sure that the 3rd vertical lines are straight.
(7) Press the [MENU] key and memorize the set value.</td></tr>
<tr><td colspan="4"> 
</td></tr>
</table>

Item	Measuring instrument	Test point	Adjustment part	Description
TRAPEZIUM	Signal generator Remote control unit		[4.DEF] 5.TRAPEZ	(1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) Select 4.DEF from the SERVICE MENU. (4) Select < 5.TRAPEZ >. (5) Set the initial setting value of < 5.TRAPEZ >. (6) Adjust to bring the vertical lines at the right and left edges of the screen parallel. (7) Press the [MENU] key and memorize the set value.
				
CORNER	Signal generator Remote control unit		[4.DEF] 7.COR-UP 8.COR-LO 9.COR-UP-S 10.COR-LO-S	(1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) Select 4.DEF from the SERVICE MENU. (4) Select < 7.COR-UP >. (5) Set the initial setting value of < 7.COR.-UP >. (6) Adjust to bring the straight line at the upper corner. (7) Select < 8.COR-LO >. (8) Set the initial setting value of < 8.COR-LO >. (9) Adjust to bring the straight line at the low corner. (10) Press the [MENU] key and memorize the set value. (11) If the extreame upper & lower corners are a little pin or barrel chose < 9.COR-UP-S > or < 10. COR-LO-S > and adjust. (12) Press the [MENU] key and memorize the set value.
				
ANGLE	Signal generator Remote control unit		[4.DEF] 11. ANGLE	• In case where there is a parallelogrammical distortion of images on the screen. (1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) Select 4.DEF from the SERVICE MENU. (4) Select < 11.ANGLE >. (5) Set the initial setting value of < 11. ANGLE >. (6) Adjust to bring the vertical lines straight. (7) Press the [MENU] key and memorize the set value.
				

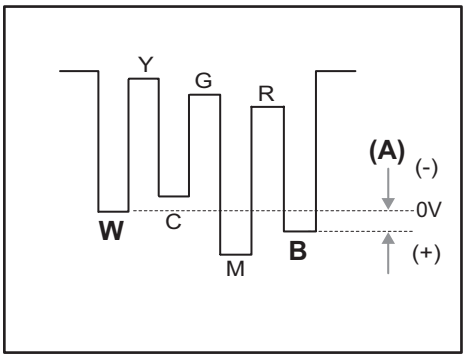
Item	Measuring instrument	Test point	Adjustment part	Description
BOW	Signal generator Remote control unit		[4.DEF] 12.BOW	• In case where there is a bow-shaped distortion of images on the screen. (1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) Select 4.DEF from the SERVICE MENU. (4) Select < 12.BOW >. (5) Set the initial setting value of < 12. BOW >. (6) Adjust to bring the vertical lines straight. (7) Press the [MENU] key and memorize the set value.
				
V.S-SHAPE CORRECTION & V.LINEARITY	Signal generator Remote control unit		[4.DEF] 13.V-S.CR 14.V-LIN	• When the vertical linearity has been deteriorated remarkably, perform the following steps. (1) Receive the cross-hatch signal. (2) Set the ZOOM mode to FULL. (3) Select 4.DEF from the SERVICE MENU. (4) Select < 14.V-LIN >. (5) Set the initial setting value of < 14.V-LIN >. (6) Select < 13.V-S.CR >. (7) Set the initial setting value of < 13.V-S.CR >. (8) Adjust < 14.V-LIN > and < 13.V-S.CR > so that the spaces of each line on top, center and bottom become uniform. (9) Press the [MENU] key and memorize the set value.
				

4.8.4 VIDEO CIRCUIT

Item	Measuring instrument	Test point	Adjustment part	Description
WHITE BALANCE	Signal generator Remote control unit		[2. V/C] 2.CUTOFF R 3.CUTOFF G 4.CUTOFF B 5.WDR R 6.WDR G 7.WDR B (Do not adjust)	(1) Receive a black and white signal (colour off). (2) Set the ZOOM mode to FULL. (3) Set the PICTURE MODE to STD. (4) Set the COLOUR TEMP to NORMAL. (5) Select 2.V/C from the SERVICE MENU. (6) Each select 2.CUTOFF R, 3.CUTOFF G, 4.CUTOFF B and adjust the screen until the black portion in the screen becomes black. (7) Each select 5.WDR R, 6.WDR G and adjust the screen until the white portion in the screen becomes white. **NOTE:** Do not adjust 7. WDR B (8) Press the [MENU] key and memorize the set value. (9) Change the contrast and brightness from low-light to high-light and check that the tracking of the white balance is good.
SUB BRIGHT	Remote control unit		[2. V/C] 8. BRIGHT	(1) Receive the any broadcast. (2) Set the ZOOM mode to FULL. (3) Set the PICTURE MODE to STD. (4) Select 2.V/C from the SERVICE MENU. (5) Select < 8.BRIGHT >. (6) Set the initial setting value of < 8.BRIGHT >. (7) If the brightness is not the best with the initial setting value, make fine adjustment until you get the best brightness. (8) Press the [MENU] key and memorize the set value.
SUB CONTRAST	Remote control unit		[2. V/C] 9. CONT.	(1) Receive the any broadcast. (2) Set the ZOOM mode to FULL. (3) Set the PICTURE MODE to STD. (4) Select 2.V/C from the SERVICE MENU. (5) Select < 9.CONT >. (6) Set the initial setting value of < 9.CONT >. (7) If the contrast is not the best with the initial setting value, make fine adjustment until you get the best contrast. (8) Press the [MENU] key and memorize the set value.

Item	Measuring instrument	Test point	Adjustment part	Description
SUB COLOUR-1	Remote control unit		[2.V/C] 10.COLOUR (PAL/SECAM/NTSC)	**[Method of adjustment without measuring instrument]** **PAL COLOUR** (1) Receive PAL broadcast. (2) Set the ZOOM mode to FULL. (3) Set the PICTURE MODE to STD. (4) Select 2.V/C from the SERVICE MENU. (5) Select < 10.COLOUR >. (6) Set the initial setting value of < 10.COLOUR >. (7) If the colour is not the best with the initial set value, make fine adjustment until you get the best colour. (8) Press the [MENU] key and memorize the set value. **SECAM COLOUR** (1) Receive the SECAM broadcast. (2) Make fine adjustment of SECAM COLOUR in the same manner as for above. **NTSC 3.58 COLOUR** (1) Input the NTSC 3.58MHz signal from the EXT terminal. (2) Make similar fine adjustment of NTSC 3.58 COLOUR in the same manner as for above. **NTSC 4.43 COLOUR** (1) When NTSC 3.58 COLOUR set, NTSC 4.43 COLOUR will automatically set.

Item	Measuring instrument	Test point	Adjustment part	Description
SUB COLOUR-2	Signal generator Oscilloscope Remote control unit	TP-47B TP-E [CRT SOCKET PWB]	[2.V/C] 10.COLOUR (PAL/SECAM/NTSC)	**[Method of adjustment using measuring instrument]** **PAL COLOUR** (1) Receive the PAL full field colour bar signal (75% white). (2) Set the ZOOM mode to FULL. (3) Set the PICTURE MODE to STD. (4) Select 2.V/C from the SERVICE MENU. (5) Select < 10.COLOUR >. (6) Set the initial setting value of < 10.COLOUR >. (7) Connect the oscilloscope between TP-47B and TP-E. (8) Adjust PAL COLOUR and bring the value of (A) in the illustration to the values as shown given billow (Voltage difference between white (W) and blue (B)). (9) Press the [MENU] key and memorize the set value. **SECAM COLOUR [Except AV-28H77SK / AV-32H77SK]** (1) Receive the SECAM colour bar signal (75% white). (2) Set the initial setting value of SECAM COLOUR. (3) Adjust SECAM COLOUR and bring the value of (A) in the illustration to the values as shown given billow (Voltage difference between white (W) and blue (B)). (4) Press the [MENU] key and memorize the set value. **NTSC 3.58 COLOUR** (1) Input the NTSC 3.58MHz signal (full field colour bar with 75% white) from the EXT terminal. (2) Set the initial setting value of NTSC 3.58 COLOUR. (3) Adjust NTSC 3.58 COLOUR and bring the value of (A) in the illustration to the values as shown given billow (Voltage difference between white (W) and blue (B)). (4) Press the [MENU] key and memorize the set value. **NTSC 4.43 COLOUR** (1) When NTSC 3.58 COLOUR set, NTSC 4.43 COLOUR will automatically set.



[PAL COLOUR VOLTAGE SETTING]

	Voltage setting	
	AV-28H4BU AV-28H4SU AV-28H40SU AV-32H4BU AV-32H4SU AV-32H40SU AV-32H47SU	AV-28H77SK AV-32H77SK
VOLTAGE (W-B)	+11V	+3V

[SECAM COLOUR VOLTAGE SETTING]

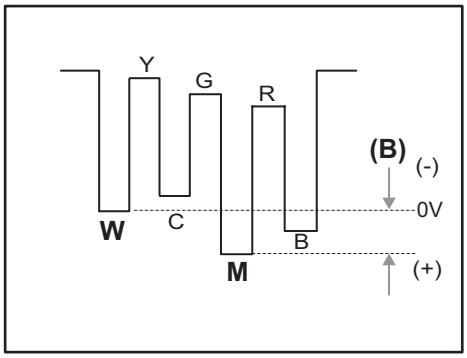
	Voltage setting
VOLTAGE (W-B)	+6V

[NTSC COLOUR VOLTAGE SETTING]

	Voltage setting
VOLTAGE (W-B)	+1V

<table>
<tr><th>Item</th><th>Measuring instrument</th><th>Test point</th><th>Adjustment part</th><th>Description</th></tr>
<tr><td>SUB HUE-1</td><td>Remote control unit</td><td></td><td>[2.V/C]
11.HUE</td><td rowspan="2">[Method of adjustment without measuring instrument]
NTSC 3.58
(1) Input the NTSC 3.58MHz signal from the EXT terminal.
(2) Set the ZOOM mode to FULL.
(3) Set the PICTURE MODE to STD.
(4) Select 2.V/C from the SERVICE MENU.
(5) Select < 11. HUE >.
(6) Set the initial setting value of < 11. HUE >.
(7) If you cannot get the best hue with the initial setting value, make fine adjustment until you get the best hue.
(8) Press the [MENU] key and memorize the set value.
NTSC 4.43
(1) When NTSC 3.58 is set, NTSC 4.43 will be automatically set at the respective values.</td></tr>
<tr><td>SUB HUE-2</td><td>Signal generator

Oscilloscope

Remote control unit</td><td>TP-47B
TP-E
[CRT SOCKET PWB]</td><td>[2.V/C]
11.HUE</td></tr>
<tr><td colspan="4"> 

[VOLTAGE SETTING]
<table>
<tr><th></th><th>Voltage setting</th></tr>
<tr><td>VOLTAGE (W-M)</td><td>-10V</td></tr>
</table></td><td>[Method of adjustment using measuring instrument]
NTSC 3.58 HUE
(1) Input the NTSC 3.58MHz signal (full field colour bar with 75% white) from the EXT terminal.
(2) Set the ZOOM mode to FULL.
(3) Set the PICTURE MODE to STD.
(4) Select 2.V/C from the SERVICE MENU.
(5) Select < 11. HUE >.
(6) Set the initial setting value of < 11. HUE >.
(7) Connect the oscilloscope between TP-47B and TP-E.
(8) Adjust < 11. HUE > to bring the value of (B) in the illustration to the values as shown given billow (voltage difference between white (W) and magenta (M)).
(9) Press the [MENU] key and memorize the set value.
NTSC 4.43 HUE
(1) When NTSC 3.58 COLOUR set, NTSC 4.43 COLOUR will automatically set.</td></tr>
</table>

4.8.5 VSM PRESET SETTING

Item	Measuring instrument	Test point	Adjustment part	Description
VSM PRESET	Remote control unit		[5.VSM PRESET] (BRIGHT/STD/SOFT) 1. CONT. 2. BRIGHT 3. SHARP 4. COLOUR 5. HUE (COOL/WARM/NORMAL) 1. WDR R 2. WDR G 3. WDR B	(1) Set the ZOOM mode to FULL. (2) Select 5.VSM PRESET from the SERVICE MENU. (3) Press the [MENU] key, and set the PICTURE MODE to BRIGHT. (4) Adjust the [FUNCTION UP/DOWN] and [-/+] key to bring the set values of 1.CONT. to 5. HUE to the values shown in the [5. VSM PRESET]. (5) Press the [MENU] key, and set the PICTURE MODE to STD. (6) Make similar adjustment as in 4 above. (7) Press the [MENU] key, and set the PICTURE MODE to SOFT. (8) Make similar adjustment as in 4 above. (9) Press the [MENU] key, and set the COLOUR TEMP to COOL. (10) Adjust the [FUNCTION UP/DOWN] and [-/+] key to bring the set values of 1.WDR R to 3. WDR B to the values shown in the table. (11) Press the [MENU] key, and set the COLOUR TEMP to WARM. (12) Make similar adjustment as in 10 above. (13) Press the [MENU] key, and set the COLOUR TEMP to NORMAL. (14) Make similar adjustment as in 10 above.

SECTION 5
TROUBLE SHOOTING

This service manual does not describe TROUBLE SHOOTING.

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